March 1961

Research pays Narricot

Modern textile management

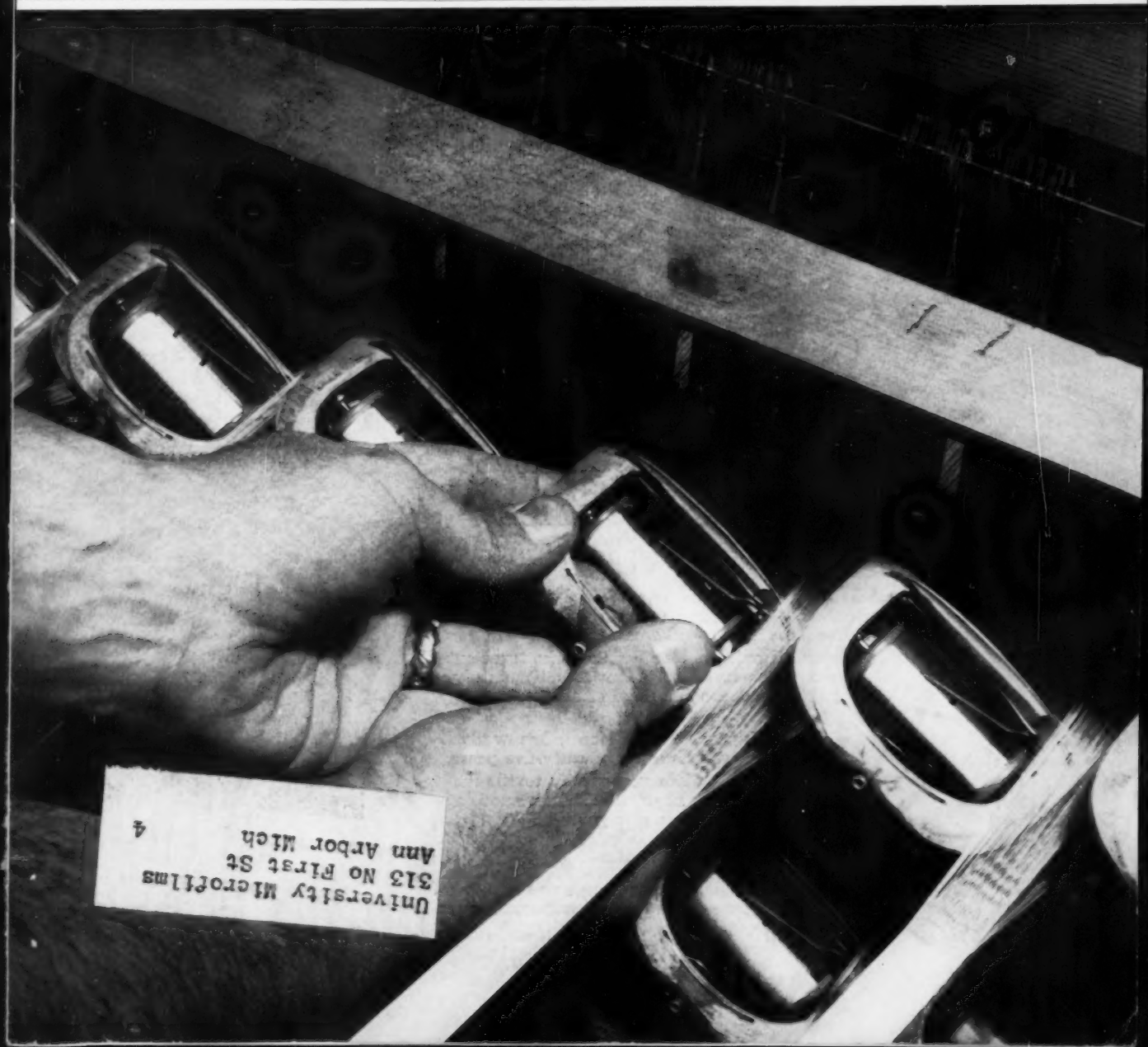
No shuttles . . . no regrets

Warp tension in wool fabrics

Complete contents on page 4

Textile Industries

a W. R. C. Smith publication formerly "Cotton" fifty cents per copy



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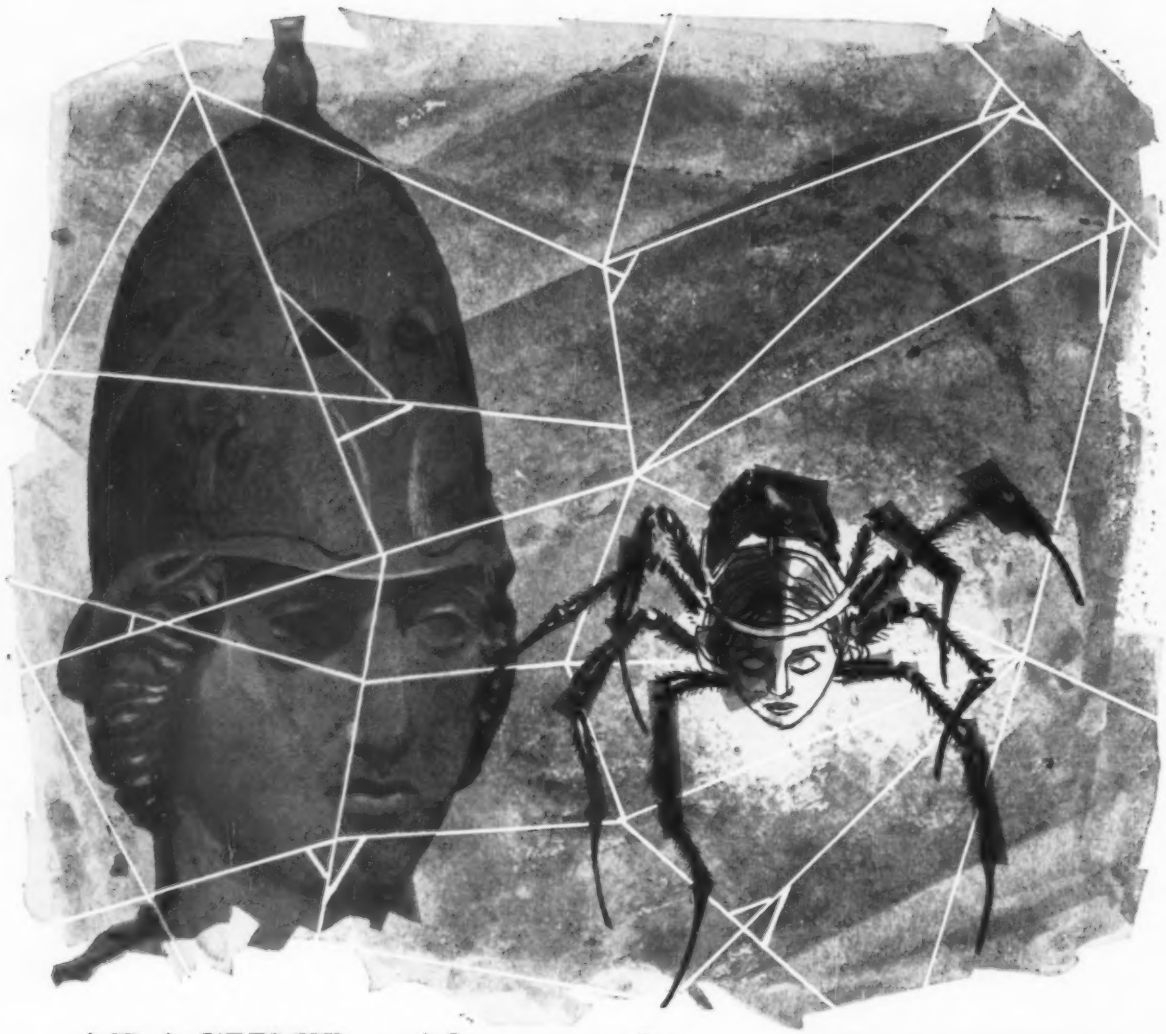


ARACHNE paid a penalty for making better textiles

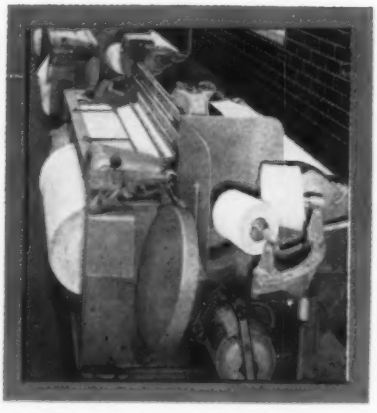
...but today you pay if you don't!

The peasant girl Arachne, mythology relates, defeated the goddess Minerva in a weaving contest—and wound up being changed into a spider (which zoologists ever since have called *arachnids*).

Today it works the other way around: the textile maker who turns out a better product receives not punishment but rich rewards. That's why so many money-makers in the field use Draper Looms powered by DIEHL transmitters.

DIEHL pioneered power transmitters for textile looms, has worked hand-in-hand with builders of textile machines for seventy-five years.

Take advantage of this long experience when you specify textile machinery, when you encounter drive problems of any *kind*. There's nothing mythical about the solid help that DIEHL can give you.



DRAPER Shuttleless Looms Powered by DIEHL Power Transmitters.

Diehl

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A Subsidiary of THE SINGER MANUFACTURING COMPANY

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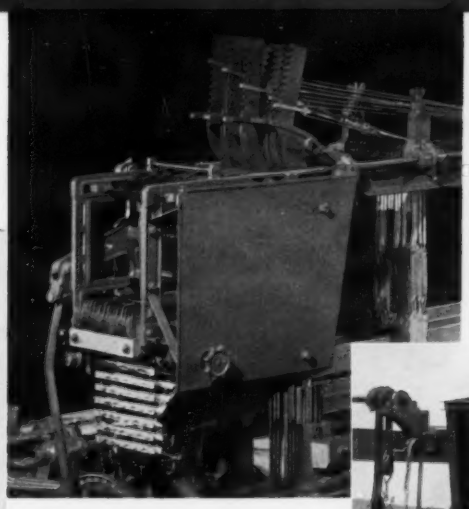
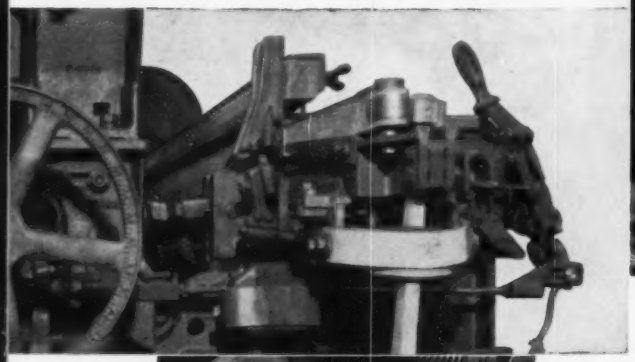
X-3

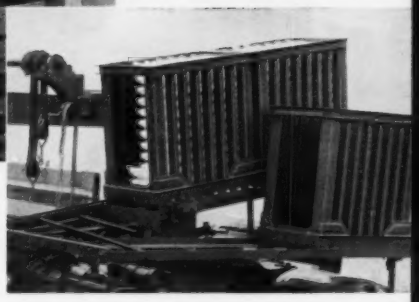
a new dimension in weaving



TOP MOTION
New strengthened Dobby
— 16 harnesses, 15/32 Gauge or
— 20 harnesses, 3/8 Gauge
Clock Spring up to 6 harnesses

ALUMINUM OR WOODEN LAY CONSTRUCTION





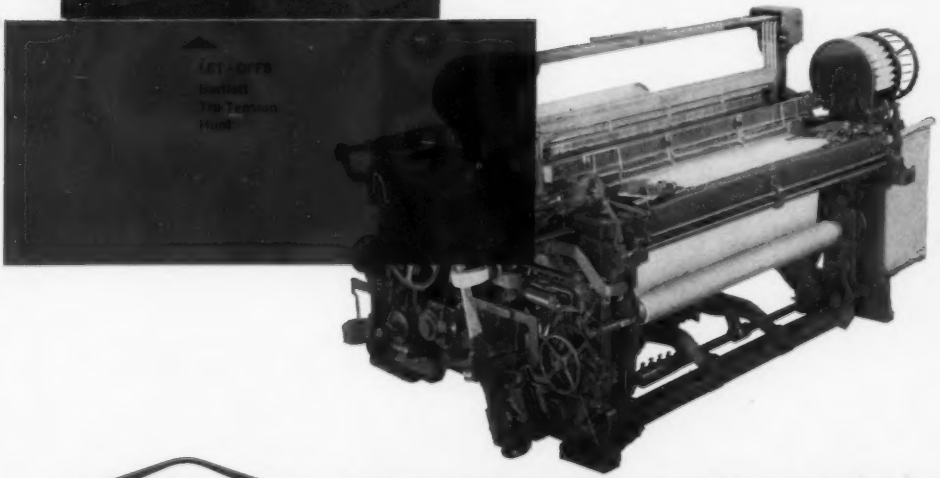
AUTOMATIC FILLING MAGAZINE

The X-3 Model Loom is designed to weave all of the fabrics normally woven on the X-2 and most synthetic fabrics commonly woven on the XD. This loom provides *greater versatility, increased speed, higher quality goods, and lower weave room costs.*

A weight increase of over 500 pounds in frame and shafting*, contributes to added stability, reduces vibration, and permits higher speeds regardless of fabric being woven.

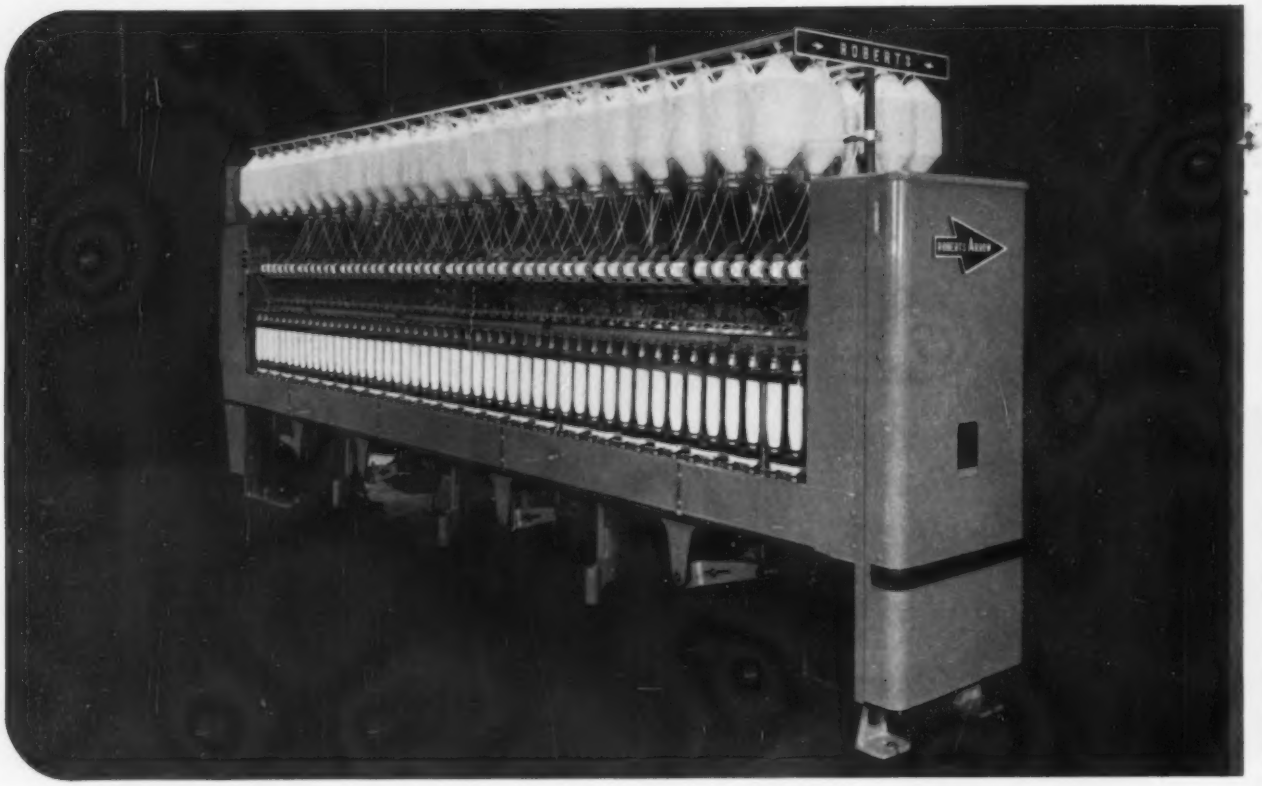
**As compared with a Draper X-2 Model Loom*

IMPROVED TAKE-UPS
to weave a complete range of Cotton and Synthetic fabrics.



DRAPER CORPORATION

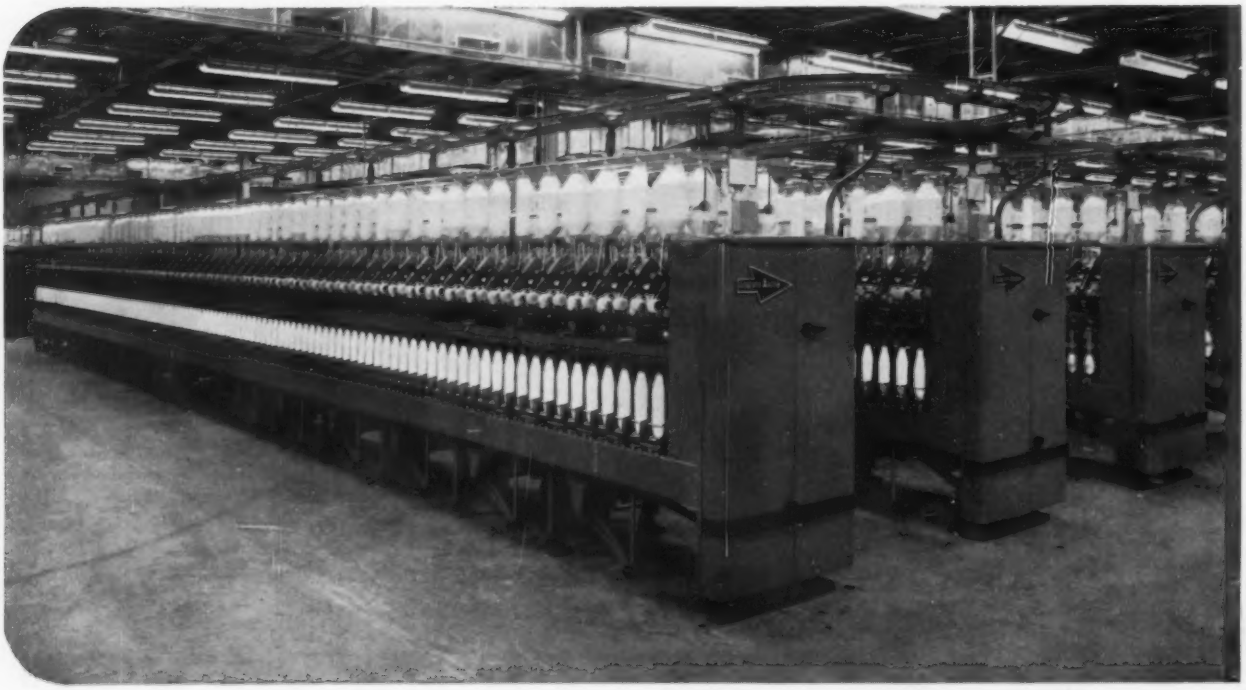
HOPEDALE, MASS. • ATLANTA, GA. • GREENSBORO, N. C. • SPARTANBURG, S. C.



ARROW Model M-1 (above) for cotton system, Model WM-1 for worsted system. 25 inches wide.

ROBERTS ARROW SPINNING for both cotton system and long fiber system yarn spinning for natural and synthetic fibers and blends. High speed, all ball bearing, big package Arrow Spinning Frames in 25-inch or 36-inch width. Exceptional flexibility and simplicity of operation in the manufacture of improved quality yarns at reduced costs and modest initial investment.

ARROW Model WM-2 (below) for worsted system, Model M-2 for cotton system. 36 inches wide.



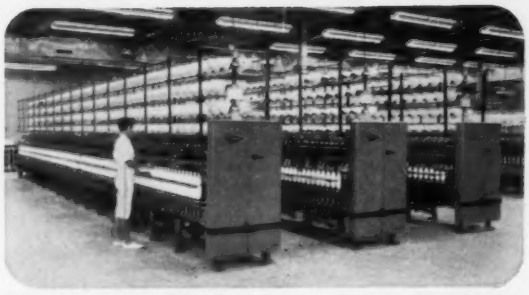
For further information use Handy Return Card, Page 155

ROBERTS

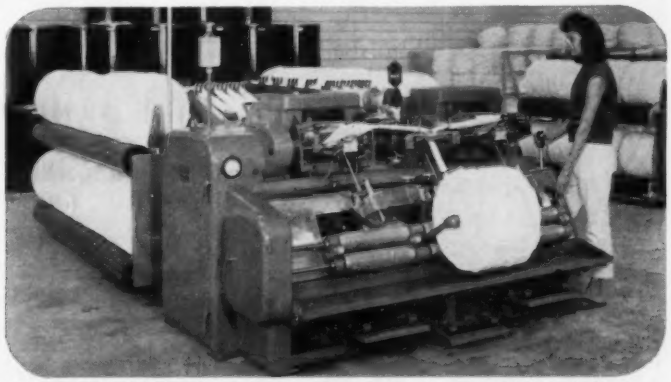
Yarn Making Machinery

FOR COTTON, WORSTED, OR LONG FIBER SYSTEMS

ROBERTS ROVING FRAMES are ball bearing rebuilt and feature all-new heavy duty ball bearing Roberts Double Apron Drafting Systems for cotton, short staple or long fiber synthetics, worsted and blends. 10x5 and 12x7 packages. Provisions for double headed spools.



ROBERTS TWISTERS for plying yarns are completely ball bearing equipped and designed for high speed ring twisting operations. 25- or 36-inch frames. Up to 4-inch rings and 12-inch bobbins. Package weights 1¼ pounds on cotton, ¾ to 1 pound on worsted.



ROBERTS-TEMATEX worsted system preparatory machines, including ParaBlenders, ParaDrafters and AutoEveners, are rugged, high performance machines for pinning, parallelizing, drafting and blending worsted and synthetic fibers prior to roving and spinning, and in top making plants. AutoEvener automatically and instantaneously corrects delivered sliver weight to within plus or minus 1%.

Simplicity of design, rugged construction and high speed ball bearing operation are the hallmarks of all Roberts Company machinery. Roberts also supplies rebuilt spinning frames and modernization changeovers for mills' existing machinery.

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EDITORIAL AND EXECUTIVE OFFICES:
806 Peachtree St., N. E., Atlanta 8, Georgia
Phone: 874-4462, Area Code 404

EDITOR
George H. Dockray
MANAGING EDITOR
J. Frank Guest
ASSOCIATE EDITORS
Milton C. May
P.O. Box 11015, Charlotte 9, N. C.
Stanley M. Suchecki
P. O. Box 685, Ridgefield, Conn.
Jesse W. Ellington
ASSISTANT EDITOR
Ann W. Hardy
BUSINESS MANAGER
John C. Cook, vice-pres.
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Walter M. Mitchell, Jr.
BUSINESS REPRESENTATIVES
BOSTON—Arthur C. Shaw, *27 Southgate Rd., Wellesley 81, Mass. (Cedar 5-3648)*
NEW YORK—William K. Hoffman, *58 Euclid Ave., Maplewood, N. J. (South Orange 2-2484).*
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GREAT BRITAIN—H. A. MacKenzie, *4a Bloomsbury Square, London W. C. 1, England.*
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THIS MONTH'S COVER

Research and development at Narricot Corp. begin with a fabric of sound construction. For the full story of how Narricot is organized for research, what its facilities are, and what the results have been, see page 65.

IN TI NEXT MONTH

Especially for knitters

■ TEXTILE INDUSTRIES for April will include a special feature for the knitting industry. The highlight will be a complete illustrated description of the new Weeks Division of Hanes Hosiery Mills Co., Winston-Salem, N.C. This ultra-modern plant, com-

pleted recently at a cost of $8 million, exclusive of production machinery, is capable of producing 50 million dozen pairs of ladies' seamless hosiery a year.

The special knitting feature will also include articles for each branch of the industry, and a preview of the Knitting Arts Exhibition scheduled for April 24-28 in Atlantic City, N.J.

And . . .

■ Look for thirteen other feature articles, covering the industry, in TI for April.

DIRT-RESISTANT Tennantized floor allows faster sweeping. Saves manhours.

Why most money-making mills have TENNANT-maintained floors

Mills that make money *today* usually know their maintenance costs to a penny.

That's why about 9 out of 10 successful mills, large and small, use the TENNANT SYSTEM of Floor Maintenance.

They know, from their own cost records, that this system provides clean, bright floors *at the lowest cost per sq. ft. of any floor maintenance method* available today. Here's why:

SAVES MANHOURS—*Tennantized* floors have 3 times the dirt resistance of most textile floors. Saves cleaning time, cuts sweeping costs, etc.

How the TENNANT SYSTEM cuts floor care costs...

1 **SAVES TIME.** Dirt is easily wiped off surface.

2 **SAVES FLOOR SEAL.** Tennantized floors seldom need refinishing.

3 **SAVES BUFFING.** New method brightens floor; cuts buffing time as much as 80%.

REQUIRES LESS FLOOR SEAL—New custom-fitted TENNANT seals are *extra* durable, dirt-resistant and easy to clean. Cuts annual seal costs and recoating expense. WRITE TODAY *for full details. G. H. Tennant Co., 735C N. Lilac Drive, Minneapolis 22, Minn.*

TENNANT

The Textile Industry's Most Widely Used

FLOOR MAINTENANCE SYSTEM

Methods

Machines

Materials

FLOOR MAINTENANCE SYSTEMS

SHORTS & REMNANTS

Vested Interests

A friend of ours, who has an uncanny knack for simplifying the complicated, told us recently, "The textile industry's problem would be solved if we could just sell more cloth." And nobody can deny it. Well, the staff of TEXTILE INDUSTRIES is trying to help do just that:

Here we have, in the usual order, **Dick Smith,** president; **Frank Guest,** managing editor; **George Dockray,** editor; and **Walter Mitchell,** advertising manager. And those vests that they're wearing mean more business for the looms of America. Next project: revival of spats for day and evening wear.

Deep, Deep Cut

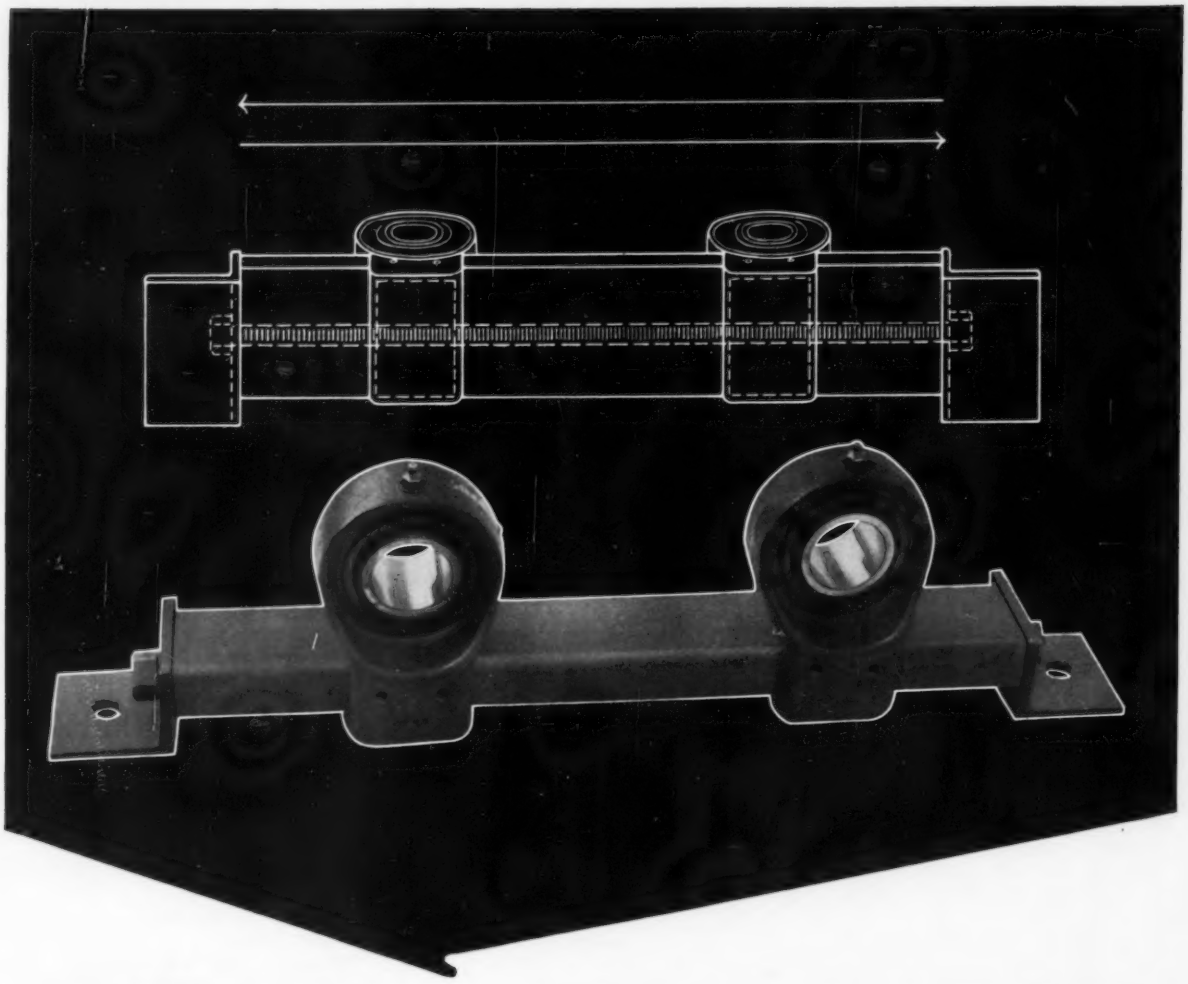
"I was somewhat surprised at the heading on page 121 of TEXTILE INDUSTRIES for December—'Cut Tricot Seconds 350%.' Obviously, if anything is cut 100% it is eliminated completely, and a reduction of more than 100% is impossible. If the front of my property along the highway is littered with 100 pounds of beer cans and empty bottles I cannot pick up and haul away 350 pounds.

"It is just because TEXTILE INDUSTRIES is usually so accurate and so extremely well edited that it gives my inferiority complex a lift to finally catch one little slip."

EDWARD W. S. CALKINS
Fiber Technologist
U.S. Rubber Co.
Winnsboro, S. C.

It seems that we went the Chesh-

For further information use Handy Return Card, Page 155



A Dixie Bearings, Inc. design saved our customer time, trouble and dollars!

Shown is a take-up unit designed by our engineers to perform two jobs simultaneously! The unit's first job is to take up slack in a large belt—Its second job is to keep indexing apparatus in the right spot on the belt.

Previously, the indexing was adjusted separately to a new position every time the belt had to be tightened, no matter how much or how little the adjustment. It was a costly, time-consuming job that kept the equipment out of production for hours.

Now, with this unit, belt take-ups and indexing adjustments are both performed with one turn of the screw on which the two pillow blocks ride.

We solved *this* customer's bearing problem. The answer to *your* problem is as near as your telephone! Call the branch nearest you now!

Providing bearing service in the South

DIXIE BEARINGS, INC.

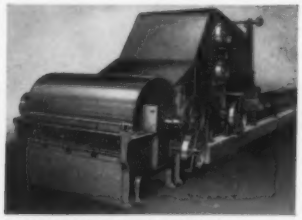
ARKANSAS: Little Rock • **FLORIDA:** Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge New Orleans • **N. CAROLINA:** Asheville • Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport Knoxville • Memphis • Nashville • **VIRGINIA:** Norfolk • Richmond • Roanoke

Since 1852

FIBRE PROCESSING MACHINERY by SARGENT

From Bale Opener through Dryer, Sargent's modern fibre processing system gives you completely automatic continuous production . . . an uninterrupted straight-line flow of quality-protected fibres at an economy you cannot afford to overlook. Let us tell you more.

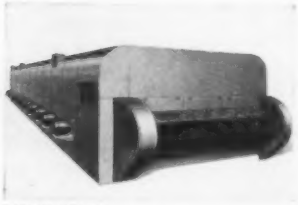
FEEDERS • OPENERS • PICKERS • BLENDERS
WASHERS • DRYERS • TOP & YARN HANDLING
AND SPECIAL PURPOSE MACHINERY



BALE OPENER AND PICKER
Continuous opening, picking and feeding, cotton linters or staple. Excellent on machine-picked cotton.

SQUIRREL CAGE DUSTER
Continuous dusting of heavy grease wools, waste, rags. Also very efficient blender.

WET AND DRY PICKER
Highly versatile—for fibres after bleaching, after dyeing. Works equally well with wet or dry fibres.



STOCK DRYER
Leads all dryers for performance and dependability on scoured or dyed wools, cotton, synthetics.

MIXING PICKER
For continuous blending—all fibres.

FIBRE PROCESSING SYSTEM
Section of recent installation showing high economy, complete dependability. Fibres are not handled from opening to drying.

STAINLESS STEEL WASHER
For scouring, bleaching, acidifying.

C. G. SARGENT'S SONS CORPORATION
Graniteville, SINCE 1852 Massachusetts

PHILADELPHIA • CINCINNATI • ATLANTA • CHARLOTTE • HOUSTON • CHICAGO • DETROIT • TORONTO

SHORTS & REMNANTS

(from page 6)

ire Cat one better—not even the grin would be left after a reduction of 350%.

Indians Not Low Paid?

"In your July 1960 issue of TI on page 75, under the heading 'World Cotton Spinning Wages' you have mentioned India last indicating that we get the advantage of low paid workers to produce cheap cloth.

"A true comparison would be to take same size of a textile mill in the nine different countries as mentioned in your above article and the total wages. If this comparison is done, I am sure India will stand among the first three.

"I am giving statistics of our cotton mill . . . a vertical unit, having spinning, weaving, bleaching, finishing, dyeing, and power house."

Monthly cotton cloth production (26 working days), lb	250,000
Average cotton yarn count	34s
Total loom hr for month	35,150
Total wages, workers and officers, rupees	420,000
Wage cost per lb of cloth, rupees	1.7
Wage cost per loom shift, rupees	11.9

F. R. MADAN
Liaison Officer
The Gaekwar Mills Ltd.
Bombay, India

There are two quotations for the value of the rupee: one dollar equals 4.8 rupees at the official rate of exchange; one dollar equals 6 rupees at the "free" rate of exchange. In either case, the labor content of a pound of fabric (35⅓ cents at the official rate, 28⅓ cents at the free rate) is greater than it would be in the U.S. There are so many variables that it would be next to impossible to give an "average" figure for labor content in this country, but somewhere around 30% of the mill selling price would probably be a fair figure. In any event, from what we know of Indian wages (less than 10% of an American textile worker's wages), the work loads in this mill must be mighty low! Any of our readers care to comment?

More Broken Ground

Here's another from our collection of first-shovelful pictures. This ground-breaking ceremony is unusual for two reasons: It featured a speech made in absentia (too bad more aren't made that way), and the

For further information use Handy Return Card, Page 155

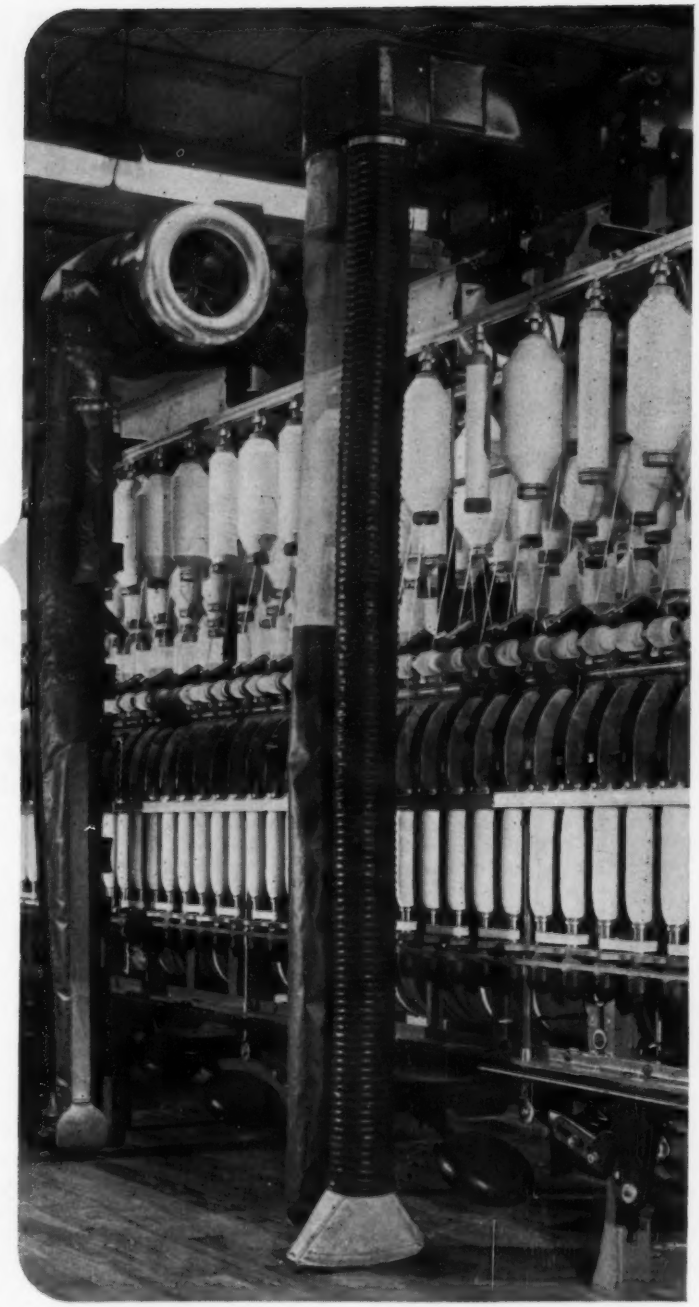
Get peak cleaning efficiency on frames, underframes, overhead and alley areas with

COMPLETE COVERAGE FEATURES

of CROSS-JET FRAME CLEANER

and VACU-PAK FLOOR SWEEPER

with automatic "Stop and Go" protection



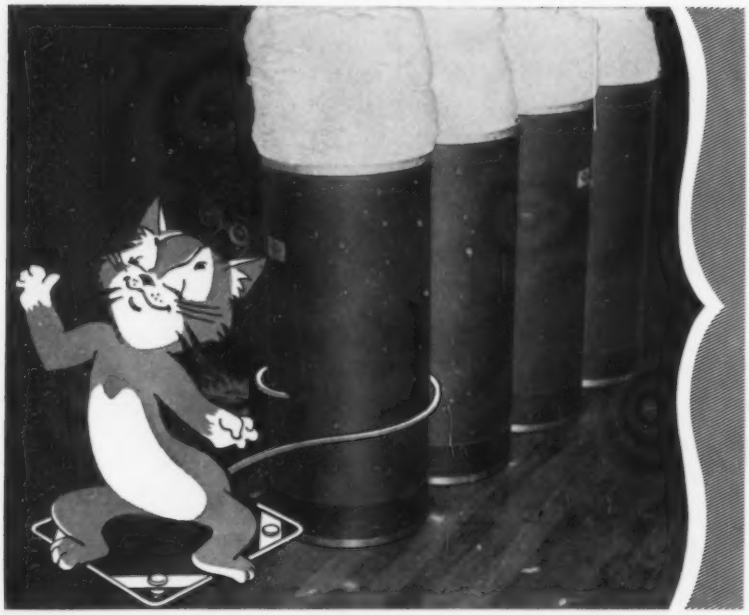
Sweeper automatically stops on contact—then automatically re-starts when free of obstruction.

1. Provides protection to frame and spindles from trunk swinging free of obstacles and back into frame.
2. Provides protection for operator to work efficiently without interruption by traveling trunk.
3. Provides protection against damage to trunk by obstacles in its path.
4. Provides protection against accidents and operating time loss.

Bahnson

AIR-O-MATION

THE BAHNSON COMPANY · WINSTON-SALEM, N. C.



SOUTHERN STATES ALLEY-SKAT* SLIVER HANDLING SYSTEM SPEEDS DOFFING AND CONVEYING BIG CANS

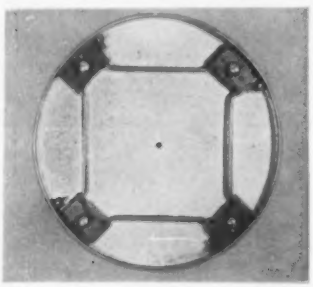
As mills convert to large diameter coilers—with cans weighing up to 12 times more than those of only a few years ago—doffing and moving heavier cans presents a problem. Yet it can be solved simply and economically with Southern States' exclusive ALLEY-SKAT system.

This unique system consists of a can dolly easily affixed to the bottom of any size can, a specially designed cantable, and latches to permit train-like movements of several cans by one man. The ALLEY-SKAT system can be used on cans 16 through 30 inches.

On new coilers, Southern States supplies the ALLEY-SKAT cantable at no additional cost. The only extra cost is for the ALLEY-SKAT dolly and latches for the system.

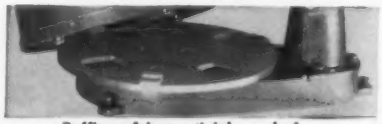
Get full information on this unique handling system from your Southern States representative or write for Bulletin 502.

Patents 2,816,328; 2,823,924; 2,908,945; 2,916,780; 2,920,902; 2,936,496; 2,950,021. Others pending.



ALLEY-SKAT Dolly mounts to inside of can rim. Dollies are made of finest materials, including heavy-duty ball-type casters.

Cantable adapter plate is available as standard equipment on Southern States Coilers at no extra charge.



Doffing of large, tightly packed cans is quickly and easily accomplished. No lifting required.

*TRADEMARK

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

SHORTS & REMNANTS
(from page 8)

principals are wearing hard hats.

That's **Hargrove Bowles, Jr.,** on the left; he's North Carolina State Director of Conservation and Development. On the right is **John L. Fancourt,** president of the W. F. Fancourt Co., and the caption says they're breaking ground for Fancourt's new building at Greensboro, N. C.

The speech in absentia was delivered by North Carolina Governor Terry Sanford, who had been summoned to Palm Beach for an audience with President Kennedy. What the hard hats are for, we don't know, unless Mr. Fancourt is a mighty ardent shovel wielder.

Wants "Man-Made Fibers"

"Would you please send me a reprint of the section from TEXTILE INDUSTRIES on 'Man-Made Fibers' found in the August 1958 issue."

GEORGE HUTTO
Tech. Asst. to Mfg. Mgr.
Mooresville (N. C.) Mills

We also have a few copies left of the similar special sections we published in 1959 and 1960. And there'll be another next August.

Contests Silk Statements

"Your August 1960 issue . . . deal-

For further information use Handy Return Card, Page 155

ing with 'Silk-Like Fabrics from Man-Made Fibers' . . . take the liberty of pointing out . . . misleading statements . . .

" . . . nowadays silk is not considered any more as a fiber of luxury . . . there is no shortage in supplies and to the best of our knowledge so far the mills did not experience any trouble in covering their requirements. . . . "

HANS VATERLAUS
Executive Vice-President
International Silk Assn. (U.S.A.) Inc.
New York, N. Y.

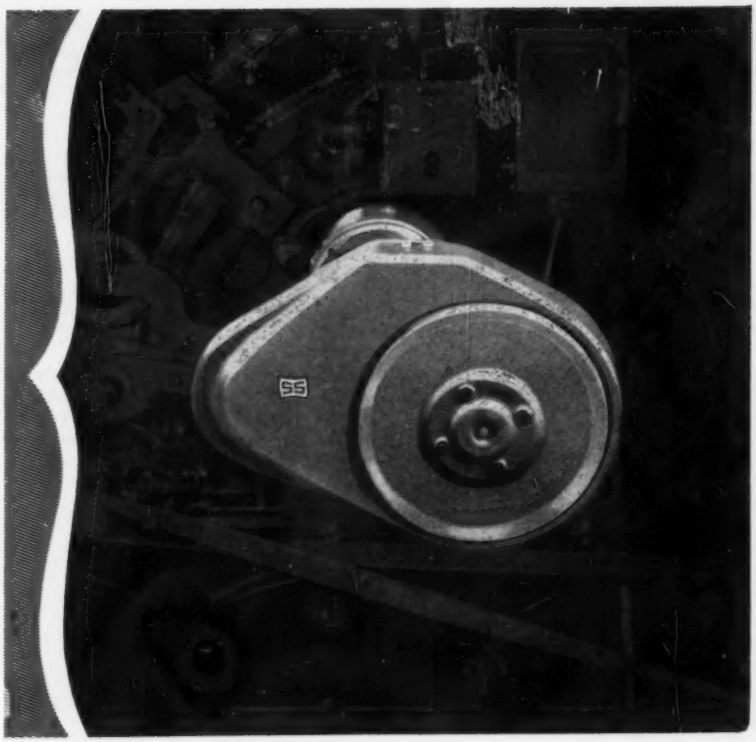
We stick to our original statements that silk *has* been universally regarded as a fiber of luxury, and that it has never been available in large supply. In fact, we're a little surprised that anyone should deny that silk is a luxury fiber. We feel that this quote from Willard C. Wheeler, chairman of the strategy board of Anderson & Cairns, Inc. (the advertising agency) sums it up admirably: " . . . Its [silk's] prospects are directly related to the broadening out of the higher-income groups and the rise in the amount of discretionary spending power. *For silk, after all, is a luxury fiber.* [Italics ours.] if utility alone is the object, other fibers can do the job. But silk, being more costly and more elegant, comes into its own when people want and can afford something extra in beauty and distinction."

As for whether or not silk has been available in large supply, we feel the fact that the mills have been able to cover their requirements is beside the point. Using Mr. Vaterlaus' own figures, U.S. mill consumption of raw silk has recently been from 4,000 to 5,000 bales of 133 pounds net per month. This is completely insignificant compared with the consumption of cotton, wool, and the synthetics. So the mills have been able to satisfy their requirements despite the fact that silk is not available in large supply. Which comes back again to our original statement that silk is a luxury fiber —and so the demand for it is not great.

We certainly have no desire to disparage silk. It's a fine fiber for those who can afford it, and we wish it well.

Honeydew

"The June 1960 issue of TEXTILE INDUSTRIES included a very interesting staff report entitled 'Shuttleless Weaving Experience Shared.' The third paragraph includes a remark about 'honeydew' affecting the filling and center fork operation. What



SOUTHERN STATES CD-2 CARD DRIVE COMBINES INTO ONE UNIT ALL OF THE FEATURES WANTED FOR COTTON CARDS

Here is why we honestly believe the Southern States CD-2 Card Drive is the safest, simplest, most efficient individual drive on the market today:

Finger-tip control. No changes in operating procedure. Unit is controlled by simple clutch lever in both starting and hand stripping.

Full speed in seconds. A 1½ hp high torque card motor brings card into full operation, seconds after clutch is engaged.

Safety engineered. All belts and moving parts are covered. Starting and idling is accomplished by simple clutch lever.

Rugged construction. The entire unit is built for heavy-duty service: steel main stand; cast iron jackshaft bracket and main pulley; cast aluminum cover. Ball bearing throughout.

Easy installation. Fits any cotton card. Minimum number of holes to drill in frame. Drive pulley, collar and clutch are preassembled and slip on to shaft using existing keyway.

Get the facts from your Southern States representative or write for Bulletin 301-a.

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

FLETCHER 1961 Models

set new standards in

NARROW FABRIC LOOMS

Top speed, high quality, low cost production for GLASS · SYNTHETICS · LIGHT or HEAVY FABRICS

High Speed Automatic POWER-FAB Loom

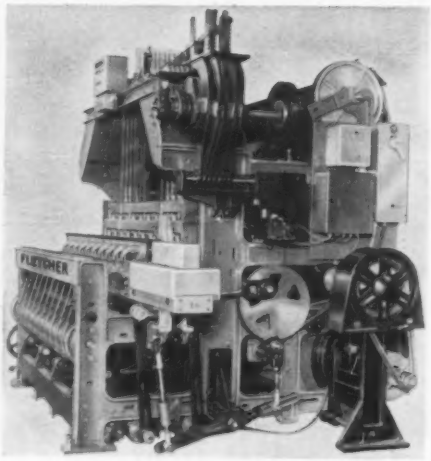
Uses less floor area. Provides maximum production per square foot. Permits increased operator work load. Greater Variety on same machine with minimum of changes.

5 foot loom 54" traverse warp beams

Quills 1¾" diameter heads

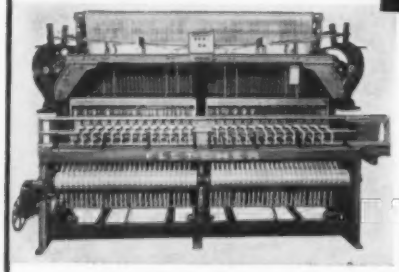
250 picks per minute for type I to IV government webbing, elastics or plastic webbing

300 picks per minute for light fabrics, ribbons, tapes or glass



TRY BEFORE YOU BUY with 3-month trial rental plan

Automatic High Speed MULTI-FAB Loom



9 foot loom, extra heavy frame construction built for maximum production of quality narrow fabrics

Up to 250 picks per minute depending on fabric

Warp length up to 10,000 yards per space

FLETCHER INDUSTRIES

Hasbrook Avenue and Beecher St., Cheltenham, Pa.

FLETCHER SOUTHERN — SOUTHERN PINES, N. C.

FLETCHER INDUSTRIES — STATESVILLE, N. C.

SHORTS & REMNANTS

(from page 11)

is meant by the term 'honeydew'?"

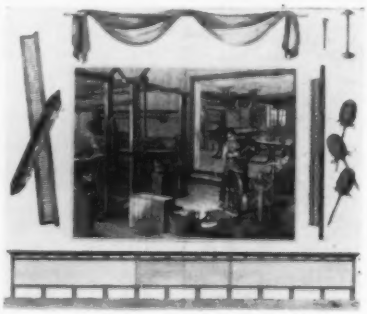
LEWIS B. PORTER
Mount Vernon Mills, Inc.
Baltimore, Md.

"Honeydew" is a sticky substance excreted by an insect called an aphid. It causes cotton to stick to drafting rolls, etc. It's a problem that's met only with cottons from areas where irrigation is used.

Commercial Developments

Among those recently requesting more information on items apearing in J. B. Goldberg's monthly column, "Recent Technical and Commercial Developments" were these: **N. E. McCulloch, Jr.,** The Rayon Processing Co. of R. I., Pawtucket; **Ernesto G. Diederichsen,** pres., Argos Industrial S.A., Sao Paulo, Brazil; **William S. Colehower,** Jomac, Inc., Philadelphia, Pa.; **P. M. Kormos,** engr. i/c fiber & fin. res., American Felt Co., Westerly, R. I.; Societa Rhodiatoce S.p.a., Milan, Italy; **George A. Caron,** mgr. r & d, A & M Karagheusian, Inc., Freehold, N. J.; **Peter Michaelsen,** administrador manufacturas del Sur S.A., Arequipa, Peru; **I. Endzins,** ch. chemist, Hilton Hosiery Ltd., Brunswick West, Vic., Australia; **Milton W. Israel,** v-p, Victor Gloves, Inc., NYC; **A. Reisfeld,** dir. r & d, Gehring Textiles, Inc., NYC; **Luis Prieto O.,** mgr., Tejidos Unica S.A., Manizales, Colombia; **Winfred Oberreit,** asst. mgr., Camp & McInnes, Inc., Reading, Pa.

► If you're interested in pictures of early textile operations, there's a display of 16th to 19th century engravings now going on at J. H. Villard, Inc., 175 Fifth Ave., New York. Here's one of them:



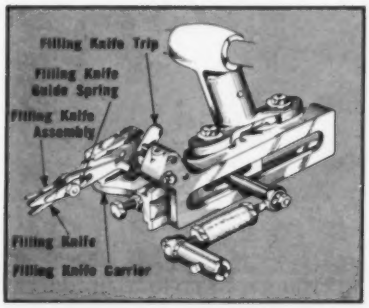
This was made in the 1840's. Others show most of the textile operations of the periods covered. And they're for sale if you want them for decorative or business purposes.

For further information use Handy Return Card, Page 155

DRAPER BRIEFS
NEWS OF INTEREST IN WEAVING

#25, #26, #27 & #28 DRAPER THREAD CUTTERS

A series of thread cutters designed to help weave better cloth at less cost



#25 Draper Thread Cutter

Stafford Thread Cutters were standard equipment on Draper looms until we introduced the #25 Draper Thread Cutter about five years ago. This new and different thread cutter features a simplified construction offering reduced maintenance costs, easier settings, and a filling knife assembly engineered to reduce drag-ins by cutting and holding the filling yarns better.

The #25 Draper is now our most popular thread cutter. It has been furnished generally on most orders for new looms in recent years. It has also been applied to existing Draper looms in 375 mills where, to a varying extent, it replaces Stafford Thread Cutters.

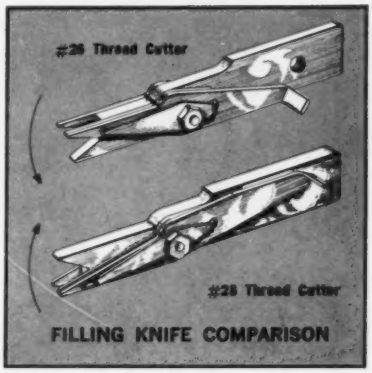
#26 Draper Thread Cutter

This thread cutter is similar to the #25 except that it has been modified as follows:

1. The Filling Knife assembly has been lengthened to permit positioning Filling Knife Carrier parts farther from the Lay. This gives a broader range of adjustment under all loom Battery conditions and makes the attainment of a correct setting easier.
2. To ensure adequate tension control with the lengthened Filling Knife, a second Filling Knife Guide Spring is incorporated so that there is a spring on each side of the knife assembly.
3. A much thicker Filling Knife, providing a longer tail on the filling between the cutting and holding side of knife, affords additional protection against a possible pull-out from knife, *especially in weaving filament yarns.*
4. As a further precaution against drag-ins, the camming surface of the Filling Knife Trip has been lengthened to prevent premature opening of the knives caused by improperly set Filling Cams.

#28 Draper Thread Cutter

The #28 Thread Cutter is a brand-new construction. It is the same as the #26 except that the cutting action is reversed, being from the bottom upward like our Stafford Thread Cutters.



FILLING KNIFE COMPARISON

#27 Draper Thread Cutter

This thread cutter is the same as the #28 Thread Cutter except that the Filling Knife is of conventional thickness (1/8″) like the #25 Draper and our Stafford Thread Cutters.

#28 DRAPER THREAD CUTTER

Robert Holmes, Overseer of Spinning at Standard-Coosa-Thatcher's Piedmont, Ala., plant examines yarn quality with Armstrong representative C. H. Cooper. Frame has double-apron drafting system equipped with Accotex NO-764 cots and NO-7876 aprons.

Your Armstrong man can help you get maximum production of quality yarn

When you specify Accotex roll covers and aprons, you get more than products to help you turn out high-quality yarn. You get the benefit of the specialized training and experience of your Armstrong man.

Whether you are faced with a high lap-up rate, excessive eyebrowing, yarn irregularities—or more routine problems of selection, installation, and maintenance of roll covers—your Armstrong representative will be able to make dependable suggestions

One thing that helps your Armstrong man in solving roll covering and apron

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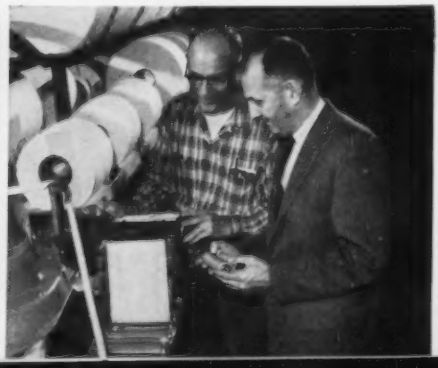
One thing that helps your Armstrong man in solving roll covering and apron problems is the wide range of materials in the Accotex line. Another is his interest in how these products perform—as shown, for example, in these pictures of Chet Cooper working with the Standard-Coosa-Thatcher personnel at Piedmont, Alabama.

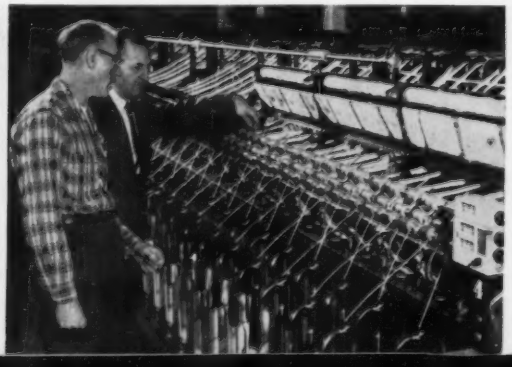
Your Armstrong man can be a valuable ally in getting maximum production of quality yarn. Call him in on any roll cover or apron problem. Or write Armstrong Cork Company, 6503 Ivy Street, Lancaster, Pennsylvania.

J. T. Formby, Assistant Superintendent of Standard-Coosa-Thatcher plant, discusses characteristics of new Accotex cot with Cooper.

J. T. Fuqua, Overseer of Carding, checks performance of comber draw box rolls (Accotex J-490 and NC-727) with Chet Cooper.



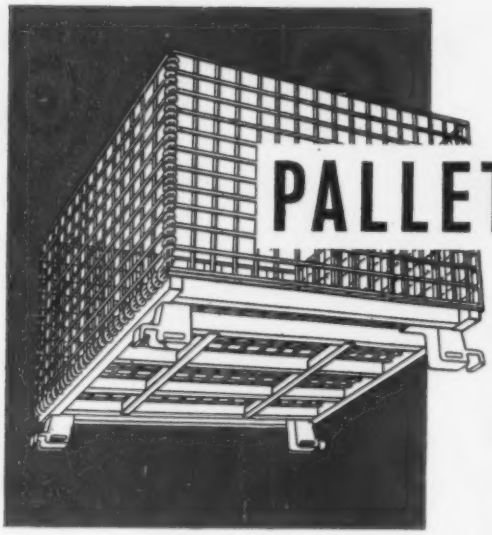
Mr. Fuqua and Mr. Cooper look over roving frame equipped with Accotex NO-764 anti-static cots and new, super-flexible NO-7876 aprons.



Charlie Howren is in charge of the roll shop. Two Armstrong model "J" buffing machines are part of the shop equipment.

Armstrong

ACCOTEX COTS AND APRONS



USP PALLETAINERS®

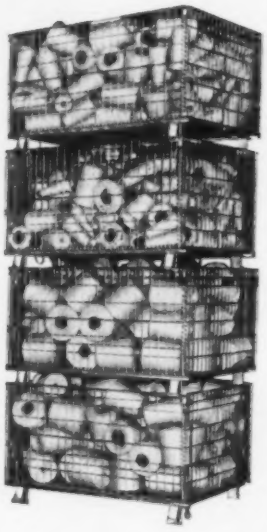
engineered containers for the.. TEXTILE INDUSTRY

USP Palletainers are readily available in a broad range of standardized sizes and types to meet practically every Textile Industry requirement or application.

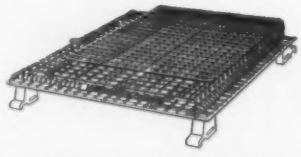
And, Textile Palletainers offer the obvious advantages of modern container, unit handling methods, the safety of sturdy steel wire mesh under standard or special protective finishes—plus the ease and simplicity of space-saving storage and rapid movement of unitized loads—more economically.

Already . . . Palletainers have revolutionized former handling methods for in-work storage of cones, spools, spindles, quiller bobins—even delicate yarns in processing phases.

Why wait? Simply phone, wire or write today and you can try Palletainers in your own plant—and see for yourself how they streamline processing, storage, interplant transport and shipment.



Textile Palletainers offer safer, higher stacking. Save more valuable floor space. Contents always visible.



Palletainers "Flat-Fold" features save storage space—lowers return freight costs.

Palletainers with gates offer complete content accessibility even when stacked. Stacking saves valuable floor space.

Delicate yarns in plastic covers in Palletainers may be stored indefinitely—always visible, accessible, safe and clean. A wide range of Palletainer snap-in liners are available.

SPECIAL OFFER

You may try USP Palletainers right in your own plant on a 60-day memo-billing basis. Your obligation is freight only.

UNION STEEL PRODUCTS CO.
Albion, Michigan

PERSONAL NOTES

J. W. Greene has been named placement director of Deering Milliken Service Corp. • • • **E. Henry Capplemann** has been appointed engineer at Hatch Mill Corp., Columbus, N. C., a division of Deering Milliken, Inc. • • • **Alan B. Sibley** has been named president of the fine goods manufacturing division, **George Asnip** has been appointed president of the worsted manufacturing division, and **Joseph E. Meeham** has become president of the woolen manufacturing division.

Allen E. Gant, president of Glen Raven (N.C.) Cotton Mills, Inc., and Glen Raven Knitting Mills, Inc., has been elected president of Glen Raven Silk Mills, Inc. **Roger Gant, Jr.,** has been named secretary and treasurer of the knitting mills and treasurer of the cotton and silk mills. **Edmund R. Gant** has been elected a director of both the knitting and cotton mills as well as a director and vice-president of Glen Raven Silk Mills, Inc. **Russell Gant** was elected chairman of the board of Glen Raven Cotton Mills, Inc. **Cecil Gant, Jr.,** was elected a director of the cotton mills, and **Kenneth Gant** has been named secretary. • • • **R. Sidney Flood** has been named director of the Glen Raven Yarn division. Mr. Flood will be responsible for sales and new yarn developments within the division.

Laurence Kogos, vice-president of the vinyl division of Farrington Texol Corp., Walpole, Mass., has been promoted to executive vice-president of the Farrington Manufacturing Company subsidiary.

Dr. Lyman E. Fourt, assistant director of Harris Research Laboratories of Washington, D. C., has been chosen as the 12th recipient of the Harold DeWitt Smith Memorial Medal awarded annually by the American Society for Testing Materials for outstanding achievement in the science of textile fiber utilization. Dr. Fourt has made many outstanding contributions to textile sci-

Continued on page 42

For further information use Handy Return Card, Page 155

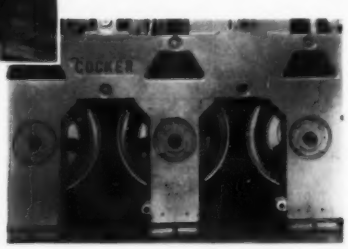
Incompar

These two GH Slashers carry a load of 1450 looms.

It is noteworthy that n
twenty years were eng
Cocker equipment fo
performs, and "out ec
valuable Cocker-engin
are some of the thing

Shown at right is th
head beam lock and
Torque Tube Drive*.
instead of the noisy
chains, and sprocke
Another Cocker featu
Drive which provide
regardless of speed o

the Cocker GH Slasher



At left is a sturdy Cocker 10
construction and a single D.A.
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Cy
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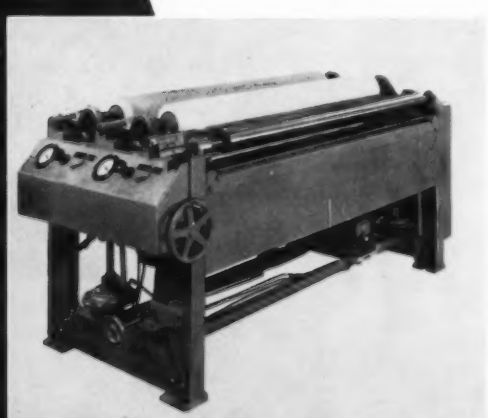
of



This is the Cocker D.A. Size Bo
loading motors which assure pre
top rolls. These replace the usual

These are a few of th
Cocker G.H. Slasher
simpler, more economi
type yarn. Be sure to g
slasher before you bu

COCKER MA

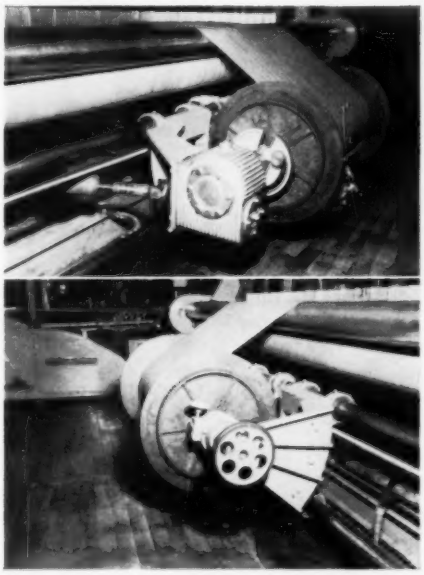
IN CANADA:
Contact W. S. Clark
Montreal, Canada
Oxford 7-2242

arably Better

hat nine out of ten of the improvements made on slashers in the past e engineered by Cocker — and many of them remained exclusive on nt for a long time. Today's Cocker GH Slasher out-produces, out-ut economizes" all other makes because it, like its predecessors, has engineered features not available on any other slashers. Shown here things which make the Cocker GH Slasher incomparably better.

is the Cocker quick release driving and part of the revolutionary Cocker ve*. This drive has only four parts oisy and troublesome maze of belts, ockets which are commonly used. feature is the patented Type B Beam ovides constant adjustable tension ed or load.

10 Cylinder Section with standard D.A. Size Box. The smaller picture below shows Cocker's new H. D. Cylinder Section construction which permits individual removal of any cylinder.



This picture shows the Cocker quick release tail spindle and Cocker's exclusive heavy duty beam carriage ball bushings.

e Box with its friction-free air e precise and even loading of usual air pistons.

of the special features which make the asher incomparably better — faster, nomical and more convenient — on any e to get the full story on this exceptional u buy.

- Production Rates 1650 lbs per hr. and over
- Speeds up to 184 ypm
- 20% to 25% more yarn per loom beam
- Handles beams from 36" to 128" with no projecting spindles
- New, clean, modern design

*Patented

MACHINE & FOUNDRY COMPANY

IN MEXICO:
Ing. J. Via, Jr.
I. La Catolica 45-911
Mexico, D. F.

PLANT & OFFICES
at Ranlo, N. C.
MAILING ADDRESS:
Gastonia, N. C.

WORLD'S LARGEST DESIGNERS AND BUILDERS OF COMPLETE WARP PREPARATORY EQUIPMENT

The Finest and Most Modern Warp Preparatory Equipment in the World

High Speed Rayon Warpers
Slow Speed Rayon Warpers
High Speed Cotton Warpers
Slow Speed Cotton Warpers
Ball Warpers
Gas Warpers
Snake and Link Warpers

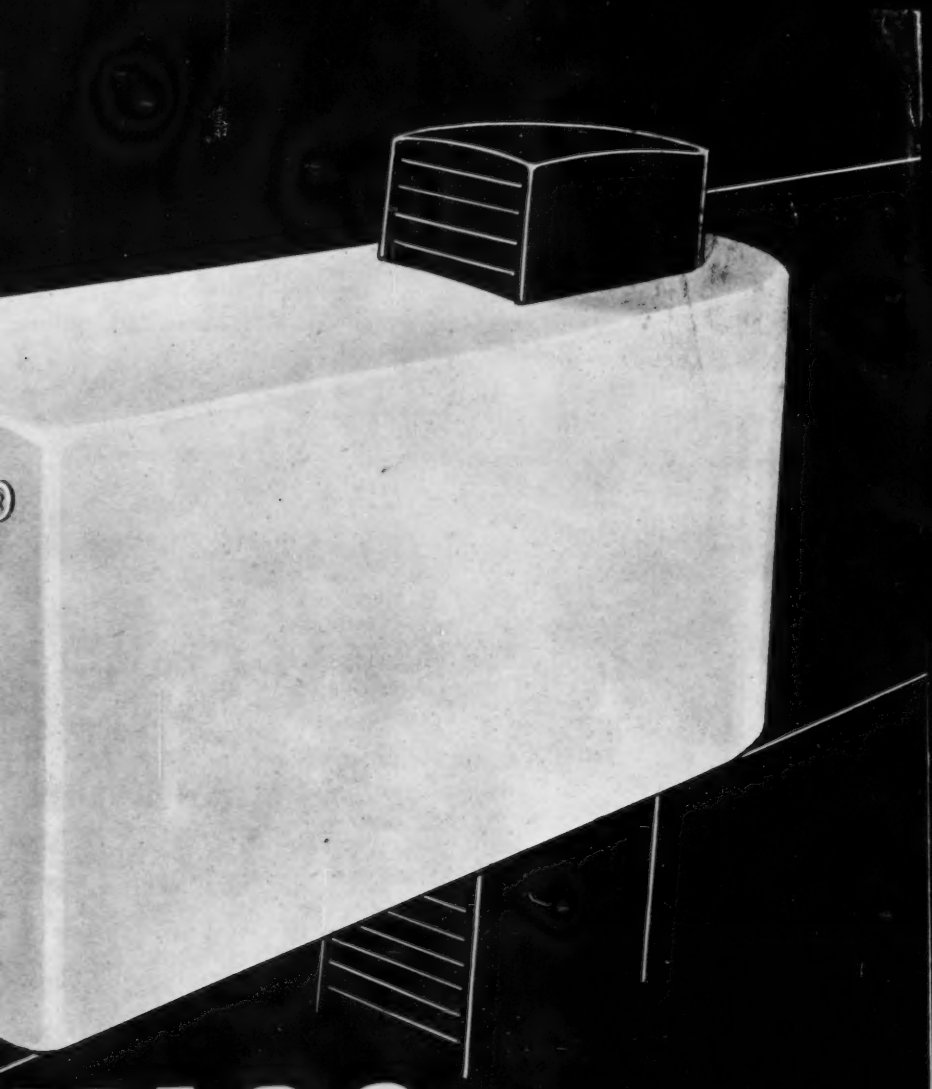
Vertical Cotton and Rayon Creels
Horizontal Cotton & Rayon Creels
Cheese and Spool Creels
Special Jute Creels

High Speed Cotton Slashers
High Speed Rayon Slashers
Jute Slashers
Carpet Slashers
Tire Cord Slashers

Heavy Duty Beamers
Cooking and Storage Kettles
Coiler and Snaker Motions
Indigo Dyeing Machines
Cloth Drying Ranges

THE LEADER COCKER AROUND THE WORLD

Only
TERM
LIGHT COLO
have a firmly e
record of
PER LO
MADE BY DEN
THE TERRE



MACO

LORED PICKERS

y established, production proved

LOWEST COST
OOM PER YEAR

DENMAN RUBBER MFG. CO., WARREN, OHIO

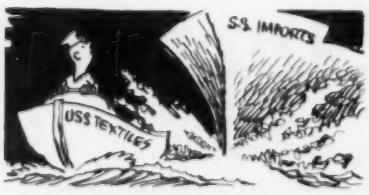
RELL MACHINE CO., INC.

CHARLOTTE, N. C.

NEWS IN BRIEF

Textile Upturn After Mid-1961? The bottom of the current textile recession will come in mid-1961, the *Value Line Investment Survey* estimates, predicting that industry earnings in the 12 months ending next June 30 will be about half those of the recent peak period (12 months ending March 31, 1960). Tentatively, the *Survey* looks for a more rapid recovery thereafter than has been usual in the past and expects the textile cycle to parallel that of general business activity. By the mid-60's, an average level of textile industry profitability is seen which will approximate the very prosperous results achieved during calendar year 1959.

Quotas the Only Answer. "It becomes increasingly clear that the best interests of all concerned —the U. S. government, the American textile industry and its employees, and the foreign exporters—would be best served by an equitable system of import



quotas, by countries and by categories, governing all forms of textiles and apparel," J. M. Cheatham, president of the American Cotton Manufacturers Institute, told the recent annual meeting of the Association of Cotton Textile Merchants of New York. "If the imports problem is not solved, there is no point in our discussing ways to improve textile affairs because sooner or later most of us will be out of business," he said.

Piece Goods Sales to Rise? Converters look for a continuing increase in retail piece goods sales this year, according to a survey by Commerial Factors Corp. Ninety per cent of the firms polled said

they were optimistic; the remaining ten per cent offered no opinion. Many of the optimists cited growing popularity of home sewing and more effective merchandising of over-the-counter goods as chief reasons for the expected sales rise.

Little Change in Failures. There were 72 business failures in the textile mill products group last year, compared with 69 in 1959, according to Dun & Bradstreet. The failed firms in 1960 had liabilities of $7,052,000; the 1959 figure was $7,338,000.

More Hosiery in '61. An increase of about 2 million dozen pairs in the sales of women's full-length stockings in 1961 was the prediction of hosiery industry spokesmen at a January meeting of department store executives and mill men which was arranged by the National Association of

Hosiery Manufacturers to promote hose sales. While final sales figures for 1960 were not available at the time, it was expected that they would exceed 63 million dozen pairs.

Shift to Lightweight Woolens. The trend to lightweight woolens in both men's and women's apparel is reflected in a marked shift during the first nine months of 1960 to production of woolens and worsteds weighing less than 13 oz per linear yd, the Wool Bureau reports. During this period, yardage on men's lightweight wool apparel fabrics was 75% of the total, up from 72% during the same period of 1959. The corresponding rise in women's lightweight wool fabrics was from 59% to 63%.

AMA Looks at Purchasing. American Management Association has formed a Purchasing Division, headed by a new AMA vice-president—Andrew M. Kennedy, Jr., vice-president for purchasing and traffic of Westing-

TO REACH TOMORROW'S MARKETS TODAY...

BEECHCRAFT SUPER 18

the mark of a progressive management

Southern Airways Company

ATLANTA AIRPORT

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Beechcraft AIRFLEET OF THE TEXTILE INDUSTRY

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house Electric Corp. The new division plans to present more than 50 seminars for purchasing executives this year.

PTI Now PCTS. The name of Philadelphia Textile Institute has been officially changed to Phila-

delphia College of Textiles and Science, reflecting the broadened scope of the school's curriculum.

Correction on Knitting Machines. In our January issue, page 21, we reported that there were "16,163 circular knitting machines in the United States on June 30, 1960, according to a survey by Morris Speizman Co., Inc." We further reported that this compared with 24,462 machines recorded in the last Speizman survey, made in 1957. Well, we picked up the wrong column from the Speizman report; the figures we quoted are from children's hose knitting machines. There was a grand total of 91,661 circular hosiery machines in the United States on last June 30, compared with 88,364 in 1957. [For more information from this survey, see TI for Feb., 1961, page 115.—Eds]

Abrasion Study. A new cotton research study, "Resistance to Abrasion," has been published by the National Cotton Council. The fifth in a series of cotton quality studies developed by the Council's utilization research division, it is available from NCC at 1200 18th St., N.W., Washington 6, D. C.

Silica Yarns. A technique for producing vitreous silica textile yarns from fused quartz canes and rods, using electrical heating devices, has been developed by Bjorksten Research Laboratories for Wright Air Development Division, U. S. Air Force. Details are given in a 53-page publication, "Development of Textile Type Vitreous Silica Yarns." Order PB 161,845 from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.; price, $1.50.

Mills Lease More Vehicles. Value of car and truck fleets leased

by the textile industry reached a new high last year—$17.7 million —according to A. J. Schoen, presi-

Estimated Japanese Synthetic-Fiber Capacity, Tons per Day

	1959	1963-1965
Polyamide	122	200
Polyester	69	130
Polyvinyl alcohol	69	200
Acrylic	80	120
Vinylidene chloride	14	20
Vinyl chloride	10	20
Polypropylene	0	30
Polyethylene	10	10
Others	?	?
TOTAL	374	730

Source: Economic Counsel Board (Japan), through *The Kureha Textile Review*

Labor-Management News

Strikes at 8-Year Low. The volume of strike activity during the year indicates that 1960 was one of the most peaceful years in labor-management relations in the postwar period, according to preliminary estimates of the Labor Department's Bureau of Labor

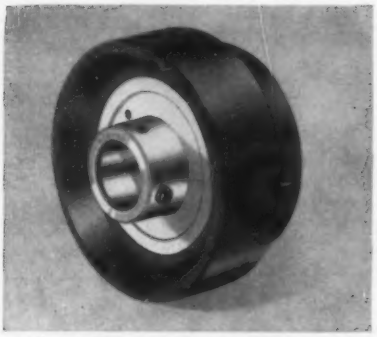
Statistics. Approximately 3,300 work stoppages began in 1960, the lowest level since 1942. These stoppages involved about 1,400,000 workers, matching the low postwar level reached in 1957. Work stoppages last year resulted in about 20 million man-days of idleness, accounting for 0.2% of the estimated working time of all employees in nonfarm establishments (except government). Strike idleness in 1960 was about 20% higher than in 1957, because of the duration of work stoppages, but was below the level for any other postwar year.

Speakers on Labor. The Chamber of Commerce of the U. S. has compiled a list of 47 experts in the labor field who are available as speakers at meetings of local Chambers of Commerce, trade associations, and civic organizations. For a free copy, write to the Chamber's Labor Relations & Legal Department, at 1615 H St., N.W., Washington 6, D. C. Ask for "Let's Talk About Labor."

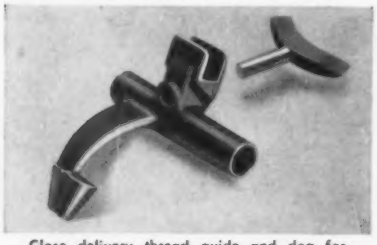
Union Ejected. Workers at Indian Head Mills' finishing plant in Hartsville, S. C., turned thumbs down on two unions within two weeks recently. First, they rejected the bid of the Textile Workers Union of America, which was trying to turn out the incumbent United Mine Workers. Then two weeks later they turned around and threw out the UMW by 138 votes to 123, leaving the employees without union representation since the plant was first unionized 20 years ago.

Union Stays In. An attempt to decertify Textile Workers Union of America as bargaining agent for the employees of Schwarzenbach Huber Co., Front Royal, Va., was defeated 111-54 in an election conducted by the National Labor Relations Board.

Dyers Get Raise. The 66 members of Textile Workers Union of America at Erie Dyeing & Processing Co. recently received a wage hike which will total 12 cents an hour—5 cents now, 4 cents next December, and 3 cents in December 1962.



Idler shell on driving roll which contacts the small end of cone on the Model 102. If this shell sticks on the bearing, it will cause hard nosed cones and burned yarns. Therefore, it requires the best in materials and workmanship.



Close delivery thread guide and dog for Foster Model 102. These parts are made from steel forgings which require very accurate and expensive dies. The finish on these parts also plays an important part in their performance.

Profilometer (which measures irregularities in millionths of an inch) used by Foster to test the inside surface of a tube which is part of the Model 102 for processing Textralized* yarn (*trademark of Joseph Bancroft & Sons).

Micro-Projector, an optical testing instrument used by Foster to magnify the silhouette of an object 62½ times and thereby reveal imperfections invisible to the naked eye.

How to Get

FULL VALUE

From Your

FOSTER WINDING EQUIPMENT

We don't have to tell you that in order to get full value from your Foster winding equipment, it must be properly maintained and repaired. The question is, how can you be assured of proper maintenance and repairing?

As to repairs, the first step is to use genuine Foster Repair Parts. Many Foster parts are made of special materials and have special finishes which cannot be duplicated with cheap substitutes. Furthermore, many Foster Parts are scientifically tested, before assembly, with high-priced testing equipment, which is not available in the ordinary machine shop. The illustrations herewith give a few examples of what we refer to.

Second, use *Preventive Maintenance*. By so doing you gain in 5 ways: — 1. Increased winding efficiency. 2. Less wear on and longer life of parts. 3. Better winding. 4. Improved customer relations (if you're a sales yarn mill). 5. Reduction in costly breakdowns. Without preventive maintenance, the same 5 gains turn into losses.

The best way to utilize preventive maintenance is to have a Foster Service Man make periodic inspections of all your Foster Winding Equipment, in conjunction with your Maintenance Supervisor. This Foster Service Man will give you a written report on the condition of your Foster equipment, will suggest improvements in maintenance practice, if necessary, and will recommend replacement of parts when advisable. There is no charge for this service *if* our representative is permitted to fit his visit to your mill into his planned call schedule.

If you would like to know more about getting full value from your Foster Winding Equipment, write for our three booklets: — "Preventive Maintenance", "Why Genuine Foster Parts" and "Emergencies are Costly". No obligations.

A Member of
American Textile Machinery Association

FOSTER MACHINE COMPANY

A Yarn Winder for Every Purpose

Westfield, Massachusetts, U.S.A.

SOUTHERN OFFICE — Johnston Bldg., Charlotte, N. C.

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dent of Wheels, Inc. Textile firms leased 1,500 trucks in 1960, up 50% over 1959; and 5,300 cars, up 6%.

Knitting Experts Change Name. Members of the American section of the International Federation of Knitting Specialists have adopted

a new name for the group—Society of Knitting Technologists—but will continue to operate as the U. S. chapter of the organization. Charles Reichman, editor of *Knitted Outerwear Times*, is permanent secretary of SKT.

N. C. State Short Courses. The School of Textiles at N. C. State College will offer two short courses for textile men this spring. "Statistical Quality Control for the Textile Industry" is scheduled for May 15-26; and "Short Course for Executives of the Textile Industry," a two-week course for those desiring refresher work or for nontextile college graduates desiring an introduction to the technical aspects of textile technology, begins on June 5. For full details, write the College Extension Division, Box 5125, State College Station, Raleigh, N. C.

Silk Movie. A new 16-mm sound motion picture, "Naturally, Silk," is being offered on free loan to adult groups, and to high school and college classes. The 15-minute

color movie was produced for International Silk Association (U. S. A.), Inc., and prints may be borrowed by writing to Modern Talking Picture Service, 3 East 54th St., New York 22, N. Y.

Who Likes Imports? The fondness of American "tastemakers" for foreign products may become a bigger problem than it is now, according to a 2,600-interview study conducted recently for *Time*. A summary of conclusions reached by the survey included this statement: "In terms of consumers, those persons most likely to own foreign products, to accept foreign products, to switch to foreign products are also the growing and buying segments of our population—the younger adults, the better educated and the monied . . . the very people United States manufacturers must sell first." The survey showed that 43% of those interviewed think that importing is a bad idea, that it causes competing American industry to lose business, and that it hurts America. However, 36% feel it is a good idea and that it helps recovery in poorer countries.

Cotton Price to Rise? Political pressure from the South will force a one- to two-cent price increase in cotton, despite the fact that "the bottom has dropped out of the textile business," according

to Eliot Janeway, president of Janeway Research Corp. But, he adds, "The industry has anticipated this political turn of events by loading up on cotton. Most mills have at least a year's supply. They stand to make nearly as much on marking up their raw material surplus as they stand to lose marking down their manufactured surplus."

Yarn Imports Soar. Yarn is being imported at the rate of 1¼ million pounds per month, compared with a total of only 1,380,000 pounds for the entire year of 1959, according to the Carded Yarn Association. For the first nine months of 1960, imports totaled 11,615,000 pounds, against 2,378,000 pounds for the three-year period ended December 1959. The Association has called for legislation to control imports of textiles in general, and of yarn in particular.

New Training Films. Four new short, 16-mm sound and color films for supervisory training have been announced by Modern Management Films, a division of The Bureau of National Affairs, Inc. They are designed to teach

the basic principles of supervision and stimulate discussion of supervisory problems. The titles: "Instructions or Obstructions," "Listen, Please," "The Case of the Missing Magnets," and "The Challenge of Leadership."

How to Avoid Raw Cotton Quotas. Imports into the U. S. of "manufactured waste," including picker laps, amounted to 11,970,000 lb during the first half of 1960, about ten times the amount imported the year before. There was also great expansion of picker lap imports during the cotton season beginning last August 1. Commenting on this, the Cotton Department of the National Bank of Commerce, Memphis, Tenn., says, "These imports are due to a decision of the Customs Bureau that picker laps are manufactured articles, and therefore not raw cotton and not controlled by import quotas on raw cotton. Yearly imports of this type material averaged about 600 bales from 1955 through 1958. The rapid increase of imports of picker lap is clearly due to the Customs Bureau providing a legal method to avoid the import quota on raw cotton. This causes confusion in the textile industry, since mills using raw cotton cannot compete with U. S. mills using lower priced cotton in imported picker laps. This competition of imported cotton in the form of picker laps is clearly beyond the spirit of the import quota law."

Air Conditioning helps **FLAGG · UTICA** *get Peak Efficiency at Grantville Mills*

Grantville Mills modern winder room is shown in large photo. Note anemostat for distributing temperature controlled air and atomizers to maintain humidity. Insert shows compressor, fan unit and air washer.

When Flagg-Utica Corporation, producers of quality knit-wear, acquired the Grantville Mills at Grantville, Georgia, they launched a complete modernization program. Realizing that modern high-speed machinery performs best in a controlled atmosphere, the decision was made to refrigerate the yarn mill.

Robert and Company Associates was commissioned to design the system, take competitive bids and supervise the installations, to assure Flagg-Utica of accurate climatic control at minimum cost.

If air conditioning is included in your modernization plans take advantage of Robert & Company's 42 years experience in working with the leaders in the textile industry.

ROBERT AND COMPANY ASSOCIATES
Textile Engineering Division
ATLANTA

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RECENT TECHNICAL AND COMMERCIAL DEVELOPMENTS

by J. B. Goldberg
Consultant to the Textile and Allied Industries

Exclusive

FIBERS AND YARNS

New-Type Nylon Rope. Introduced by British Nylon Spinners, Ltd., a new type of nylon yachting rope is made up of bundles of parallel filament yarns enclosed in a braided spun nylon sheath. The new rope is said to be superior to conventional ropes due to practically no strength loss and extensibility equal to that of the original yarn. The absence of twist eliminates internal stress and strain.

Transparent Sewing Thread. A California manufacturer is offering what is described as a transparent yarn of nylon. It is reported that the thread assumes the color of the fabric which is sewn. Elimination of the need for color matching reduces inventory requirements.

Improved Light-Fastness of Saponified Acetate Yarns. A British patent disclosed the use of resorcinol monobenzoate stabilizer, either incorporated in the filaments or applied to the surface of high-tenacity saponified acetate yarns as a means for reducing strength loss on exposure to light.

Kodel for Germany. A joint enterprise called Faserwerke Huels GmbH has been established by Tennessee Eastman Co. and Chemische Werke Huels AG of West Germany to produce and sell polyester fiber in the European market. The fiber, called "Kodel" in the U.S., will eventually be produced in a plant that Faserwerke has under construction at Marl in the North of the Ruhr area.

Polypropylene for Japan. AviSun Corp. has concluded an agreement with Shin Nippon Chisso Hiryo KK of Tokyo to manufacture and market polypropylene resin, film, and fiber in Japan. AviSun, equally owned subsidiary of American Viscose Corp. and Sun Oil Co., has a current capacity of 45 million pounds per year of polypropylene, which will be increased to 120 million pounds when a plant now under construction at New Castle, Del., goes into production next June.

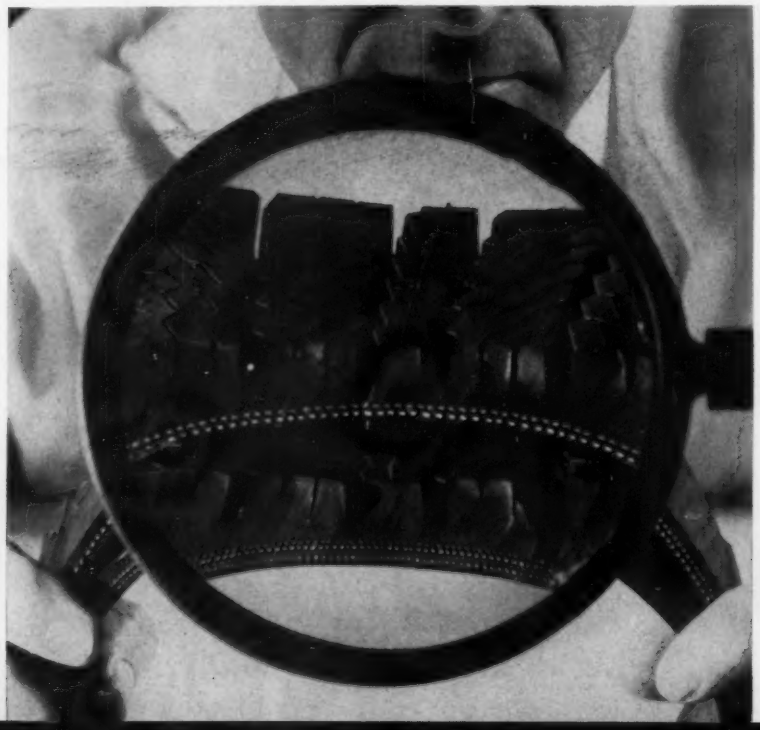
MACHINERY AND PROCESSES

Pattern Effects in Warp Knitting. Patented by the British Rayon Research Association, a warp knitting machine provides for a larger range of stitches than is obtainable on conventional machines, with individual elements of the comb controlled by a Jacquard mechanism.

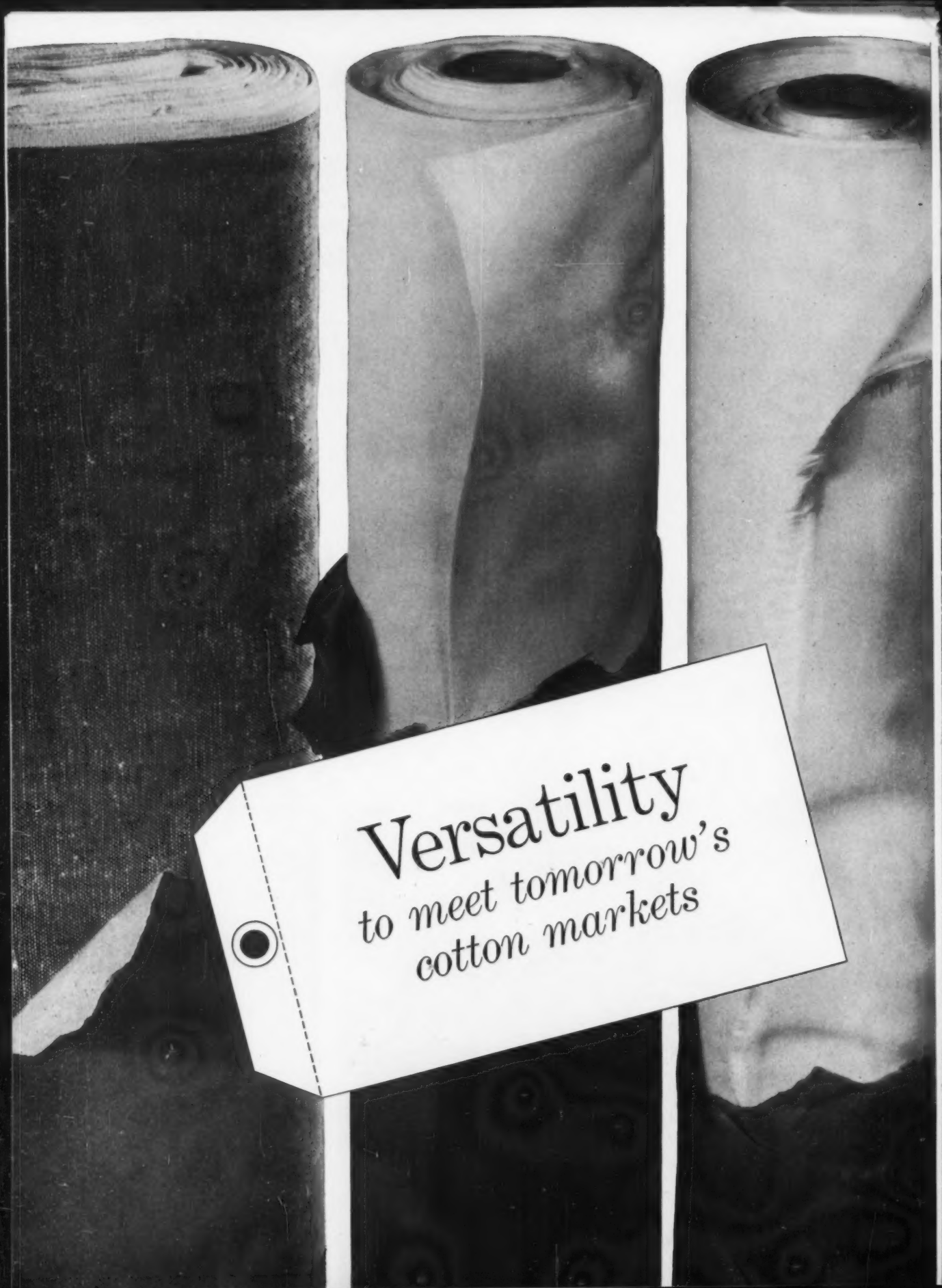
Electronic Device for Yarn Inspection. A Long Island company is producing a photo-electric yarn defect detector as an inspection device for use on warpers. The device detects and counts linear de-

Continued on page 70

New B.F. Goodrich tire for compact cars will use less textiles—it has two plies of cord instead of four. Claim is made that the new tire is lighter in weight, softer riding, and cooler running than present tires for compacts, with no sacrifice of strength or wear life.



New bath mat by Carter Bros. has textured Caprolan nylon face and nonwoven backing. It is claimed that the mat can be machine-dried in only seven to ten minutes.


Versatility
to meet tomorrow's
cotton markets

Change governs today's textile production and dictates tomorrow's textile markets. These constant changes hold a promise to the prepared and a threat to the inflexible. The markets demand versatility.

With UNIFIL® Loom Winders your weave room becomes completely market-oriented. UNIFIL's unmatched versatility allows you to meet your market's mood — single shuttle weave rooms can switch from one filling count to another, from one fabric to another, as swiftly as market changes dictate — UNIFIL can increase your earnings per loom in many ways.

UNIFIL permits your mill to wind from any supply economically. Quills are wound and shuttles loaded, empty quills stripped and returned for rewinding — all automatically at the loom. The reduction of inventory and production planning, work scheduling and employee training are further benefits of UNIFIL, accrued by elimination of several operations.

With the trend toward blends in the cotton field, the growing stretch fabric vogue and the dynamic changes that fashion will bring in the future — UNIFIL offers you a unique form of market insurance. For the complete UNIFIL story, including the low initial investment, call your nearest Leesona Sales Engineer — in Boston, Philadelphia, Charlotte, Atlanta or Los Angeles. Or write LEESONA CORPORATION, P.O. Box 6088, Providence 4, Rhode Island. Orient your mill for a larger share of today's cotton fabric market with versatile UNIFIL.

Some of the many cotton mills that are looking ahead with UNIFIL Loom Winders.

BEMIS BRO. BAG CO.
BERKSHIRE HATHAWAY, INC.
BURLINGTON INDUSTRIES, INC.
CANNON MILLS CO.
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TALLASSEE MILLS

Leesona Leads to Better Fabrics

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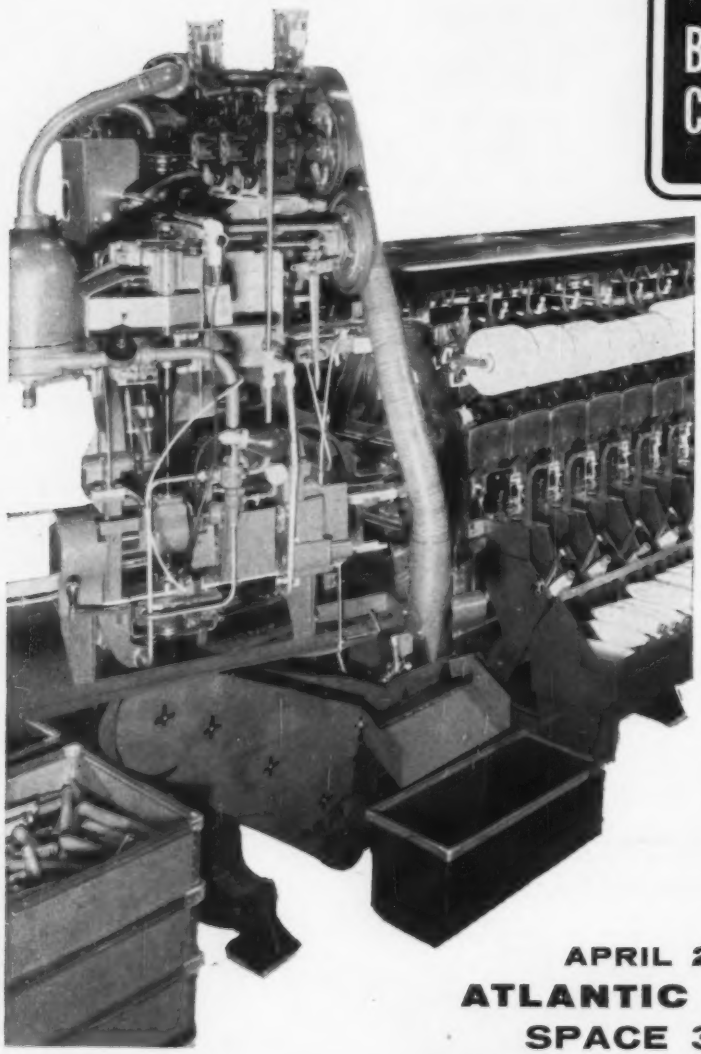
SEE IT IN ACTION!
WINDING 6° CONES AT THE KNITTING ARTS EXHIBITION...

BARBER COLMAN



TYPE FF AUTOMATIC SPOOLER

This machine will wind the new 6° cones (in this case, on flocked bakelite cores), these cones then being put on a knitting machine to demonstrate exactly how well they perform under actual operating conditions. Be sure to see how well these cones are wound on the Barber-Colman Automatic Spooler. Note the low, uniform, air-friction yarn tension — the firmness and evenness of the wind — the minimum of taping — the efficient yarn cleaning — the ease of operating the machine — and "Every Knot a Weaver's Knot." Consider, then, the significant advantages of using Barber-Colman 6° cones in *your* mill . . .

APRIL 24 to 28
ATLANTIC CITY, N. J.
SPACE 31 and 35

AUTOMATIC SPOOLERS • SUPER-SPEED WARPERS • WARP TYING MACHINES • WARP DRAWING MACHINES

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EXECUTIVE VIEWS

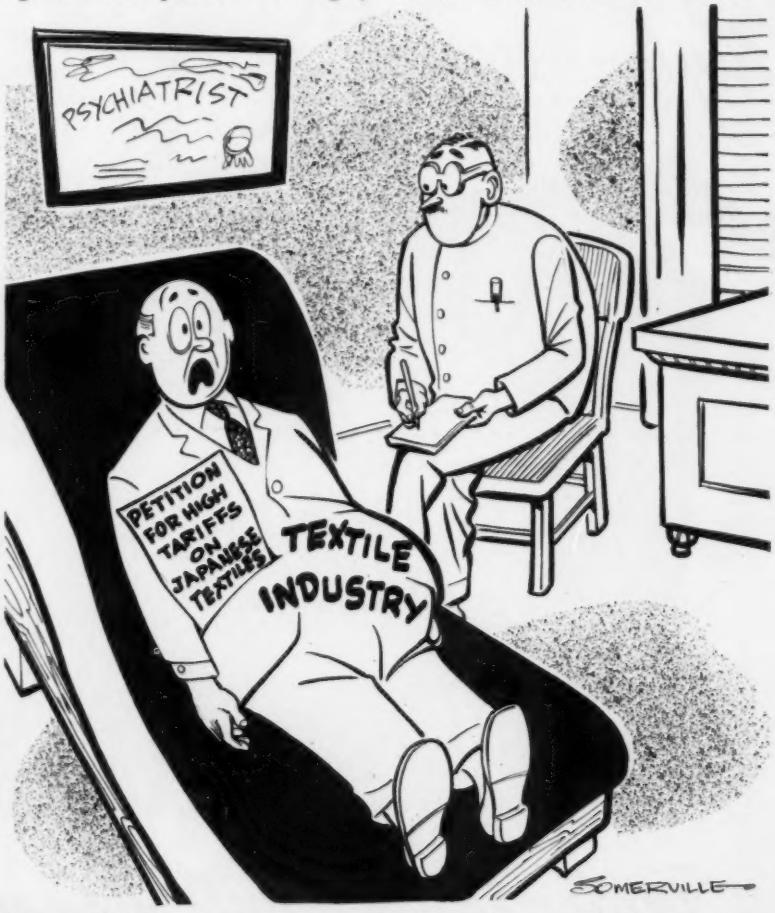
Prepared by a man who is closely identified with the textile industry.

The destruction of free enterprise

THE RIGHT to own and enjoy the use of property is one of the most precious rights that human beings can possess. Among the most odious aspects of communism is its denial to the people of the right of ownership. This country was developed industrially by individual enterprisers who were constantly inventing new things, or developing the inventions of others, and who made what they wanted the way they wanted to make it, and who ran their businesses to suit themselves. The people who worked for these enterprisers sought jobs of their own free will and were perfectly at liberty to quit the jobs of their own free will whenever they felt like it.

That was what we called "free enterprise." It built the richest and most powerful nation ever seen, and provided the highest standard of living ever known. Free enterprise may now be on the way out, and when it goes out, the next step will probably be some form of communism.

During the past few years, there have been a number of serious strikes over the question of who shall manage a business—the people who are employed by it as workers, or the people who are employed by the owners as managers. The latest and most notorious of these strikes was the one against the Pennsylvania Railroad. This strike had purely to do with questions of internal management. No questions of wages, hours, or general working conditions were involved. The unions which called the strike were de-



"Doc, why do my Japanese spinning frames keep laughing at me?"

NOW... get Relative Humidity readings directly with this portable *Taylor* recorder

New Taylor 100J Relative Humidity Recorder is actuated by Nylon Fibre elements that change in length with variations in moisture content. This physical change is magnified by a special mechanical linkage and used to actuate a pen which records humidity *directly* on an easy-to-read 24-hour chart. The two-pen instrument shown here also records dry bulb temperatures.

Why don't you take advantage of these many fine features:

Easy to read. No conversions to make.
Portable. Weighs only twenty-five pounds. Handle is standard equipment.
Accuracy unaffected by periodic saturation.
No water supply connections. No troublesome wicks to change.
Dependable, trouble-free service . . . same mechanism as time-proven 76J Recorder.
Low cost . . . Shelf delivery.

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Write now for **Bulletin No. 98410.** Taylor Instrument Companies, Rochester, New York, and Toronto, Ontario.

Taylor Instruments **MEAN ACCURACY FIRST**

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termined to impose upon the management of the Pennsylvania Railroad conditions which were harmful to the railroad and to its customers, the public.

The Pennsylvania, like many other railroads, has been facing hard times. Its passenger business has been falling off and it has found it necessary to close passenger stations and abolish passenger runs. The union would stop this, and prevent the railroad from selling any facilities that would deprive a union man of his job.

The Pennsylvania, like many another railroad, has learned that it can have repair work done much cheaper outside than it can in a railroad shop featherbedded to death by labor unions. These strikers sought to deprive the Pennsylvania of the right of having repairs done anywhere except in a unionized Pennsylvania repair shop.

About 20,000 people were involved in precipitating this strike. In shutting down the railroad, they threw nearly 70,000 other people out of work, and in a few days many other thousands of people were unemployed in plants served by the Pennsylvania Railroad and unable to get supplies or move finished goods without railroad service. Several hundred thousand patrons of the railroad also experienced inconvenience and material loss through this strike, but nothing could be done about it. Our ridiculous labor laws permit people to do things like this which would be crimes if done by employers or anybody not protected by the magical aegis of the labor union.

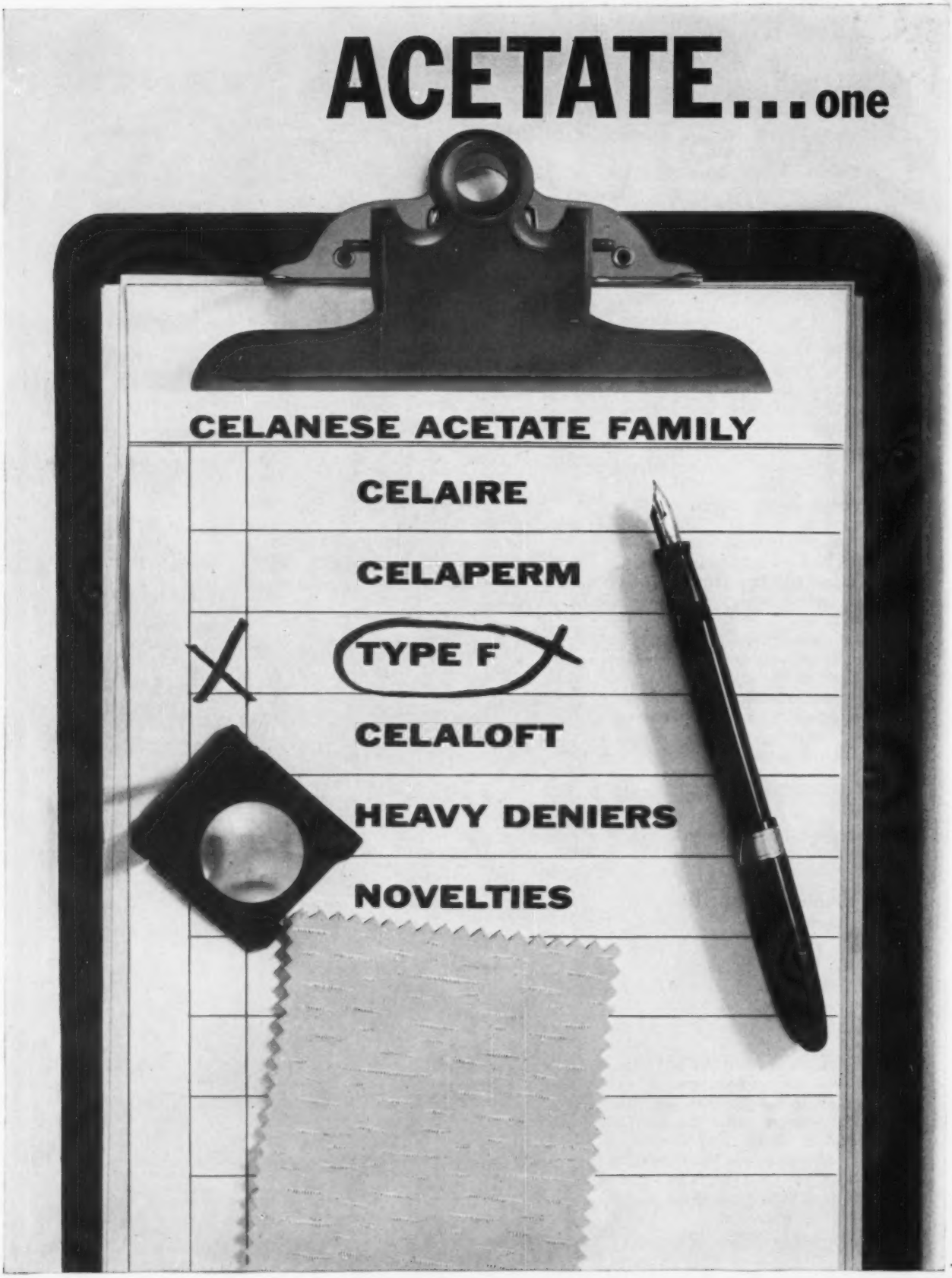
SEVERAL YEARS ago the L&N Railroad had one of these strikes over what appeared to be a policy matter which should not have been any business of the labor unions. The railroad was shut down for some time, trestles were burned, property was destroyed, and nobody could do anything about it. About that same time, Westinghouse was shut down for weeks by one of these strikes aimed at letting the union get control of management.

While the Pennsylvania strike

Continued on page 78

FUTURE EVENTS

Date		Event	Location
Mar.	3	Delaware Valley Section AATCC	Beck's on Blvd. Philadelphia, Pa.
	10	Hudson-Mohawk Section AATCC	Johnstown, N. Y.
	16-17	Textile Research Institute annual meeting	Hotel Commodore New York City
	16-17	ASME Textile Engineering Conference	Clemson College Clemson, S. C.
	17	Western New England Section AATCC	Shelton, Conn.
	23-24	Textile Quality Control Association	Hotel Charlotte Charlotte, N. C.
	23-25	American Cotton Manufacturers Institute annual meeting	Fontainebleau Hotel Miami Beach, Fla.
	24	Northern New England Section AATCC	Colonial Country Club Lynnfield, Mass.
	24	Metropolitan Section AATCC	Kohler's Swiss Chalet Rochelle Park, N. J.
Apr.	2	Piedmont Section AATCC	Washington Duke Hotel Durham, N. C.
	6	Piedmont Div., Southern Textile Association	Johnston YMCA Charlotte, N. C.
	7	Niagara Frontier Section AATCC joint meeting with Ontario Section CATCC	St. Catherines, Ont.
	12-14	Alabama Textile Manufacturers Association annual meeting	Buena Vista Hotel Biloxi, Miss.
	14	South Carolina Div., Southern Textile Association	Clinton High School Clinton, S. C.
	15	South Central Section AATCC	Hotel Patten Chattanooga, Tenn.
	15	Mid-West Section AATCC	Schroeder Hotel Milwaukee, Wis.
	16-18	Narrow Fabrics Institute, Inc., meeting	The Tides Inn Irvington, Va.
	18-19	Institute of Textile Technology board of directors and technical advisory committee	ITT Charlottesville, Va.
	19-21	Southeastern Regional ISA Conference and Instrument Exhibit	Park Center Charlotte, N. C.
	20	National Knitted Outerwear Association annual meeting	Waldorf-Astoria New York City
	22	Southeastern Section AATCC	Atlanta, Ga.
	22	Textile Operating Executives of Georgia carding and spinning discussion	Ga. Tech Atlanta, Ga.
	24-28	Knitting Arts Exhibition	The Auditorium Atlantic City, N. J.
	24-25	Underwear Institute annual meeting	Hotel Dennis Atlantic City, N. J.
	24-25	National Association of Hosiery Manufacturers annual convention	Claridge Hotel Atlantic City, N. J.
	26-29	Georgia Textile Manufacturers Association annual meeting	Hollywood Beach Hotel Hollywood, Fla.
	27-28	Fiber Society	Ga. Center for Continuing Education, Athens, Ga.
	29	Alabama Textile Operating Executives slashing and weaving discussion (formerly May 6)	Thach Auditorium Auburn, Ala.
	29	Northern North Carolina-Virginia Division, Southern Textile Association	Cooleemee, N. C.
May	4-5	AIEE conference on Electrical Application for the Textile Industry	Heart of Atlanta Motel Atlanta, Ga.
	16-17	Cotton Research Clinic and Cotton Marketing Conference	Peabody Hotel Memphis, Tenn.
	24-27	Tufted Textile Manufacturers Association annual meeting	Deauville Hotel Miami Beach, Fla.
June	23-24	Southern Textile Association annual convention	Ocean Forest Hotel Myrtle Beach, S. C.
Sept.	28-30	AATCC national convention	Hotel Statler Buffalo, N. Y.
Nov.	8-9	Chemical Finishing Conference	Sheraton Park Hotel Washington, D. C.



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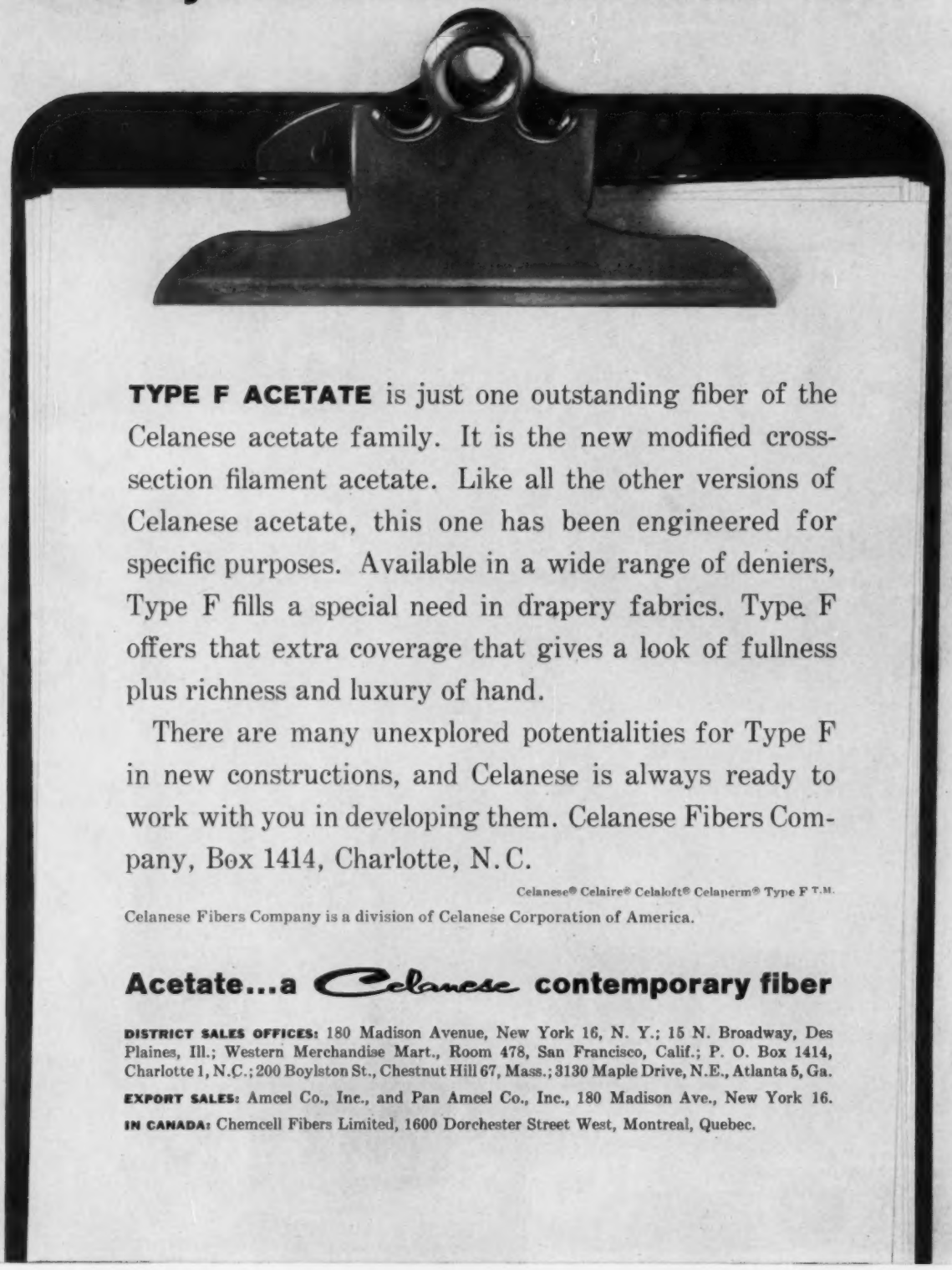
# of today's most versatile textile fibers



TYPE F ACETATE is just one outstanding fiber of the Celanese acetate family. It is the new modified cross-section filament acetate. Like all the other versions of Celanese acetate, this one has been engineered for specific purposes. Available in a wide range of deniers, Type F fills a special need in drapery fabrics. Type F offers that extra coverage that gives a look of fullness plus richness and luxury of hand.

There are many unexplored potentialities for Type F in new constructions, and Celanese is always ready to work with you in developing them. Celanese Fibers Company, Box 1414, Charlotte, N. C.

Celanese® Celaire® Celaloft® Celaperm® Type F T.M.

Celanese Fibers Company is a division of Celanese Corporation of America.

Acetate...a Celanese contemporary fiber

DISTRICT SALES OFFICES: 180 Madison Avenue, New York 16, N. Y.; 15 N. Broadway, Des Plaines, Ill.; Western Merchandise Mart., Room 478, San Francisco, Calif.; P. O. Box 1414, Charlotte 1, N.C.; 200 Boylston St., Chestnut Hill 67, Mass.; 3130 Maple Drive, N.E., Atlanta 5, Ga.

EXPORT SALES: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16.

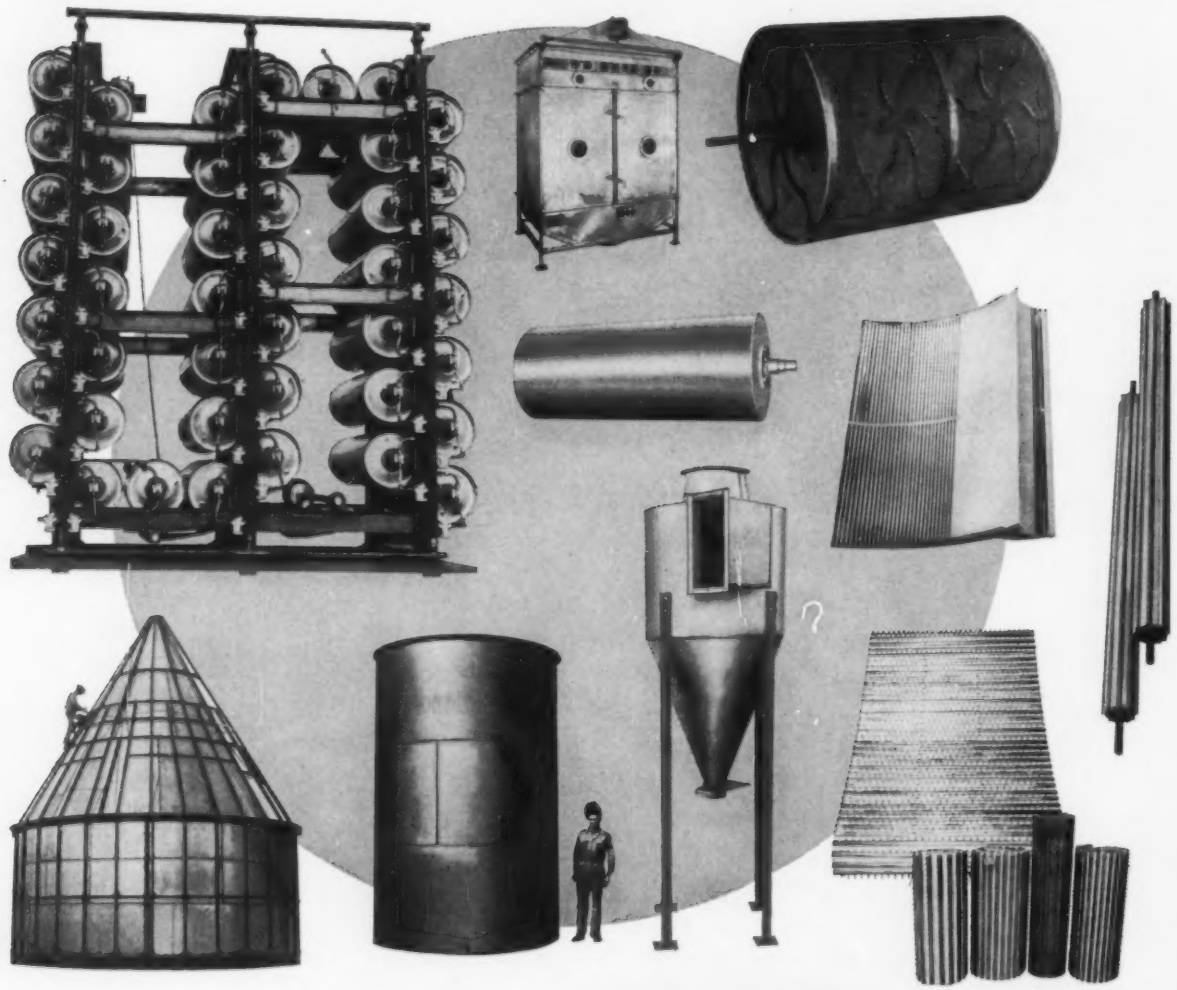
IN CANADA: Chemcell Fibers Limited, 1600 Dorchester Street West, Montreal, Quebec.

"Custom tailors" to industry

Since 1926, Sims has been designing and fabricating the specialized equipment called for in the manufacture of textiles.

As "custom tailors" of stainless steel, Sims' recommendations, designs, and fabrications are dictated by your particular problem, need, requirement or application of equipment. And, Sims specialists are on the job from start to finish to assure meticulous attention to even the smallest detail... the craftsmanship that unconditionally guarantees that the finished product will meet and surpass your most exacting specifications.

rolls · vessels · kettles · coils · size boxes · linings · cylinders · machinery · air and material handling systems . . . for textile · chemical · food processing · pulp-paper and other industries



Write, wire or call today for complete information:

Harley D. Hohm, Inc., 128 Buist Ave., Greenville, S. C.
Friday Textile Machine & Supply Co., Gastonia, N. C.

Sims
METAL WORKS
WEST POINT, GEORGIA

Specialists in
Stainless Steel Fabrication

For further information use Handy Return Card, Page 155

Look what happened to
THE CORN WE TOOK OFF THE COB
Beauty is what happened.
Beauty and color and enduring charm . . . captured in textiles. We stand ready to supply your company with materials of highest quality—from the corn we took off the cob.
AB
STARCHES • DEXTRINES • GUMS
For warp sizing, finishing, printing and dyeing.
ANHEUSER-BUSCH, INC.
Bulk Corn Products Division
St. Louis, Missouri

The Cone Mills story of achievement in the textile industry was first recorded in 1895. This was a proud endeavor, with much promise for the future. During the past 66 years the Cone record has been continually improved and amplified. Today it speaks for itself in full, rich tones which portray a heritage of progress and innovation in textiles.

The story will be recorded many times in the future. And each time, it will echo in clear fidelity the story of Cone progress without sacrifice of quality. Today, Cone listens to its 65 year-old record with pride . . . and looks upon the challenge of the future with confidence and optimism.

CONE MILLS CORPORATION

"Where fabrics of tomorrow are woven today."

CONE®

Executive Offices: Greensboro, N. C. • Selling Organization: CONE MILLS, INC., 1440 Broadway, New York City

For further information use Handy Return Card, Page 155

Left: Bearing lubricated with competitive oil. *Right:* Bearing lubricated with Shell Vexilla D is still bright after 5000 hrs.

Left: Bolster using competitive oil is sludged and corroded. *Right:* Bolster using Vexilla D is virtually spotless after 5000 hrs.

BULLETIN:

Shell reveals how new sludge-fighting Vexilla Oil D reduces spindle wobble, saves yarn that once would have been lost.

A leading textile mill compared Shell's new Vexilla® Oil D with a good, competitive spindle oil. They ran both oils for 5,000 hours at 9,000 rpm on identical frames.

Vexilla D whipped competition cleanly: No deposits or corrosion to cause wobbly spindles or excessive ends down.

And Shell's new oil did not spoil an inch of yarn. It is made to scour out of all fibers—synthetics included. Read how this new Shell oil may save money on your frames.

NEW SHELL Vexilla D was developed to solve two major spinning problems:

1. To keep contaminants from adhering to spindle blades or settling in bolster cases—a common cause of wobbly spindles.

2. To cut down yarn losses due to oil misting. *Vexilla D readily washes out of yarn.*

Here is how new Vexilla Oil D functions:

New Shell Vexilla D is a *dispersant* oil. This simply means that Vexilla D keeps little bits of sludge (oxidized oil) and lacquer from "growing." And it prevents them from depositing on sensitive spindle parts.

See the difference

In six months or less you start seeing the results of Vexilla D's dispersancy. Spindle blades are bright and clean. No sludge deposits or lacquer in bolsters. No corrosion. No costly spindle wobble.

With no sludge deposits and corrosion there is less spindle drag. Fewer ends down. Less maintenance.

Resists foaming

Vexilla D is specially formulated by Shell to resist foaming. Powerful additives prevent foaming and misting—even at maximum speeds. Oil stays in the bolster where it belongs.

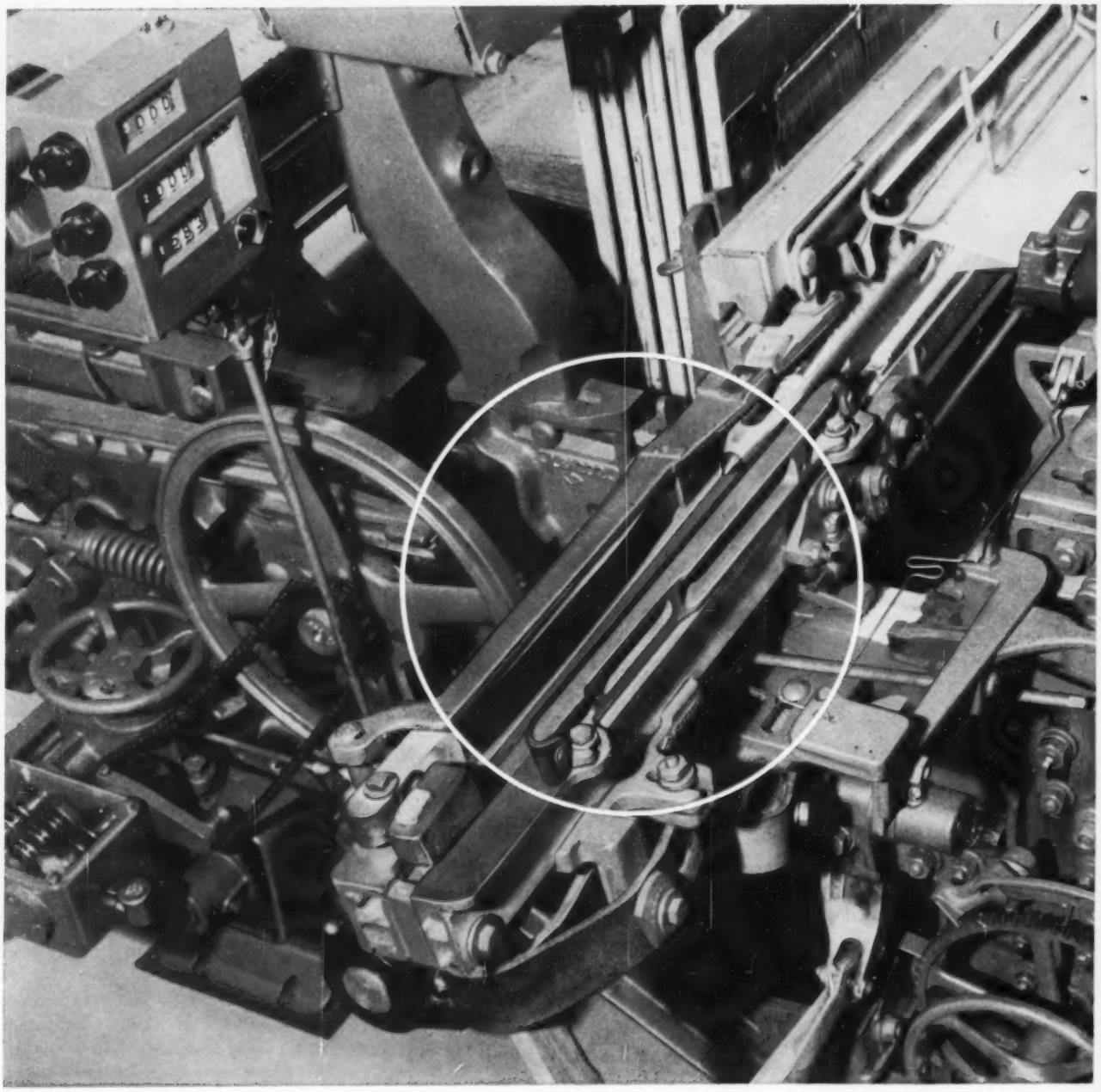
But Shell didn't stop there. A special cleansing agent was also added to Vexilla D.

No longer need good yarn be ruined by oil thrown up by spindles or by accidental spillage. Vexilla D does not stick to yarn. It washes out, as mill experience shows.

Check your Shell Industrial Products representative for complete facts on new Vexilla Oil D. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N.Y.

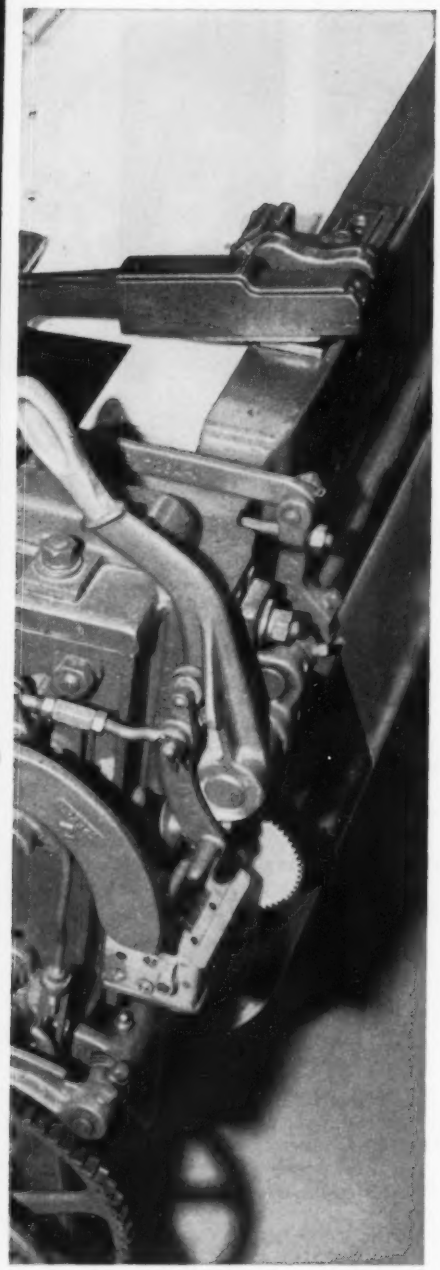
SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry.



CN-889 is a tough, dimensionally stable fiber material, unaffected by changes in temperature and humidity. It requires less break-in, less resetting, less frequent replacement—and thus adds productive hours to your looms.

For further information use Handy Return Card, Page 155



New binder material reduces loom down time

Armstrong CN-889 — a synthetic covering for loom binders and box fronts—can open the way to important savings in your weave room.

CN-889 reduces break-in time and requires less resetting than natural materials. It wears much longer, even where heavy plastic shuttles are used. This means fewer (and shorter) shutdowns for adjustment and replacement of binder covering . . . and more productive hours for your looms.

This superior performance is possible because CN-889 is more uniform than conventional materials. Dimensionally stable, it is unaffected by swings in temperature and humidity that can impair the performance of natural covering.

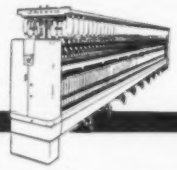
Your Armstrong man will arrange for a test on your looms. Call him or write Armstrong Cork Company, 6903 Ivy Street, Lancaster, Pennsylvania.

Armstrong LOOM SUPPLIES

MORE OF WHITIN

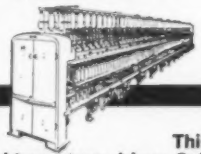
Whitin builds, in addition to the Model N (shown opposite), other models of Spinning Frames for Cotton and for Wool, Worsted and blends as well.

PIEDMONT Model K Spinning



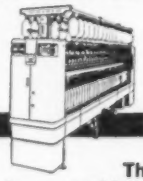
Introduced as "the most advanced Spinning Frame in the world!" 27" wide, it is unsurpassed for the high speed production of top quality yarns of cotton or spun synthetics.

WHITIN SUPERFLEX Spinning



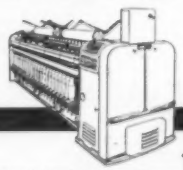
This 39" conventional-type, tape-driven Spinning Frame is the real "work horse" of the industry with millions of spindles in operation. It has a solid reputation for dependable performance in producing high quality yarns at low cost.

PIEDMONT Model KW Spinning



The Piedmont Model KW is a combination of two great developments — the Whitin American System adapted to a Piedmont chassis. The finest frame available for spinning worsteds, long staple synthetics or blends of both.

FLEX-SPIN Wool Spinning



The new Flex-Spin Wool Spinning Frame makes available to woolen mills a frame providing maximum production, package size and performance. It features a 16" traverse, reciprocating ring and spindle rails and balloon control rings.

All these models are outstanding in their fields. All share in design and construction, those distinctive touches so unmistakably Whitin.

WHITIN

PERSONAL NOTES

(from page 16)

ence, and has published 28 papers on fiber, yarn, and fabric properties.

W. Lindsay Wylie has been appointed manager of product development and technical service for knitting and tufting yarns in the textile division of United States Rubber Co.

Dr. Kurt John Winter, textile consultant, has been elected president of the national American Association for Textile Technology, Inc. Other officers elected were: 1st vice-president—**Giles E. Hopkins,** consultant; 2nd vice-president—**John M. Holland,** Pepperell Mfg. Co. * * * New York Chapter: chairman—**Hugh J. Beard,** Burlington Tricot Fabrics Co.; vice-chairman—**Dr. J. Edward Lynn,** consultant; treasurer—**Richard W. Nelson,** Chemstrand Corp.; secretary—**Bernice S. Bronner,** consultant. * * * Appalachian Chapter: chairman—**Wallace T. Jackson,** Eastman Chemical Products, Inc.; vice-chairman—**Robert T. Crawford,** Eastman Chemical Products, Inc.; secretary—**Robert L. Beard,** Tennessee Eastman Co.; treasurer—**Mildred L. Wetzel,** Tennessee Eastman Co. * * * Piedmont Chapter: chairman—**Dr. A. Frank Tesi,** Celanese Fibers Co.; vice-chairman—**Professor D. S. Hamby,** North Carolina State College; secretary—**Charles D. Coleman,** J. P. Stevens & Co., Inc.; treasurer—**A. E. McKenna,** Clemson College textile school.

John M. Cart has been named vice-president of Powell Knitting Co., Spartanburg, S. C. Mr. Cart succeeds **Clyde Wilkins,** who will continue as a consultant.

Harry T. O'Neil has been promoted to vice-president of Continental Elastic Corp. Mr. O'Neil will continue in charge of plant facilities and manufacturing technology for the plant and its foreign affiliates.

Hans Eyl Runge, executive vice-president of Abney Mills, has retired. Mr. Runge will continue as a member of the board of directors.

Tyrus O. Jones has been named plant manager of the new Clark-Schwebel Fiber Glass Corp. facility in Anderson, S. C.

Joseph L. Lanier, president of West Point Manufacturing Co., has been named chairman of the American Cotton Manufacturers Institute committee on economic policy.

Edwin Morgan
Morgan Mills

James Morgan
Morgan Mills

Morris Morgan
Morgan Mills

Ralph Sanders
Morgan Mills

R. G. Stewart has assumed responsibilities as superintendent of Craftspun Yarns, Inc., Kings Mountain, N. C. New owners of the firm have not been announced.

Wade F. Denning, vice-president and general superintendent of Wiscassett Mills Co., Albemarle, N. C., has retired.

Albert L. Green has been promoted to manager of the supply department of Beaumont Mills, Spartanburg, S. C.

Max F. Schmitt, president of The Wool Bureau, Inc., has resigned. The management, operations, and program of the Bureau will be the joint responsibility of **Dr. Gerald Laxer,** director of science and technology, and **Felix J. Colangelo,** secretary-treasurer.

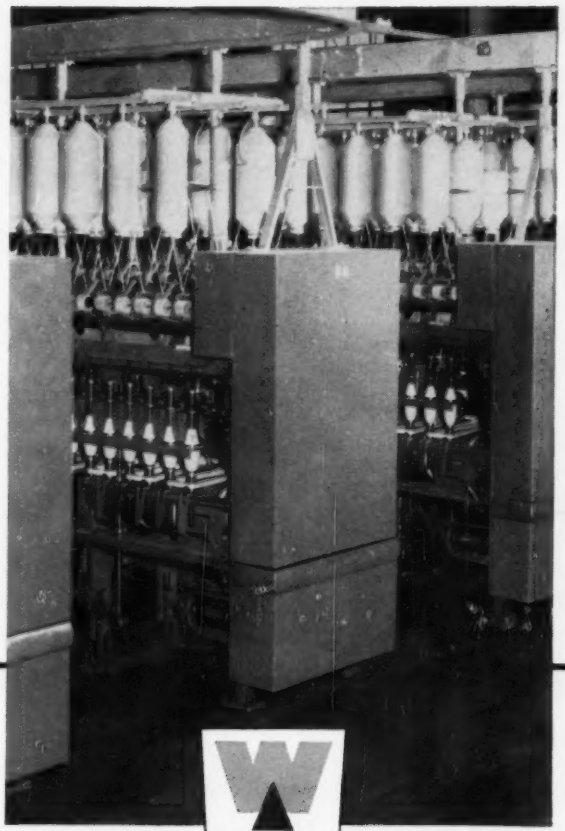
J. P. Stevens & Co., Inc., has announced the appointment of **Richard G. Adams** as head of fiber glass research for the Stevens' research laboratories in Garfield, N. J.

James L. Morgan has been elected president of Morgan Mills, Inc., Laurinburg, N. C., succeeding his father, **Edwin Morgan,** who has been named chairman of the board of directors. **Morris Morgan** has become secretary and **Ralph Sanders** has been elected executive vice-president and treasurer.

Continued on page 49

". . . in cotton spinning, Whitin has built more of the spinning frames, currently in operation in the United States, than all other makers combined"

Millions of Whitin-built spindles are in production today — dramatic proof of Whitin's ability to build the kind of spinning the industry wants. As a case in point, consider our new Model N Spinning Frame. Its quick acceptance again spotlights Whitin's alertness to the needs of the modern spinner. Only Whitin, with century-long experience and unequalled facilities, could have produced such a frame. It's a functional spinning frame — cut trim and lean — a compact combination of essential features, many tempered by mill test — others, new as tomorrow — deftly coordinated into a tough, hard-to-beat frame — a frame designed to spin your yarn competitively.



Model N Spinning at Texas Textile Mills, Inc.

But, best of all, the price is cut trim and lean to match! The Model N can help you keep "the competitive edge." Your Whitin Representative can tell you how. Why not call him today?

* Findings from a recent mill machinery facilities survey.

WHITIN machine works

WHITINSVILLE • MASSACHUSETTS

CHARLOTTE, N. C. • GREENSBORO, N. C. • ATLANTA, GA. • SPARTANBURG, S. C. • DEXTER, ME.

The best way to better yarns

Chemstrand grew 170,000 square feet yesterday

Announcing the new Chemstrand Research Center, Inc. Here, more than 300 scientists are engaged in the research that will shape the fibers of tomorrow!

From Chemstrand's new Research Center will come the most important raw material in our business and yours: ideas.

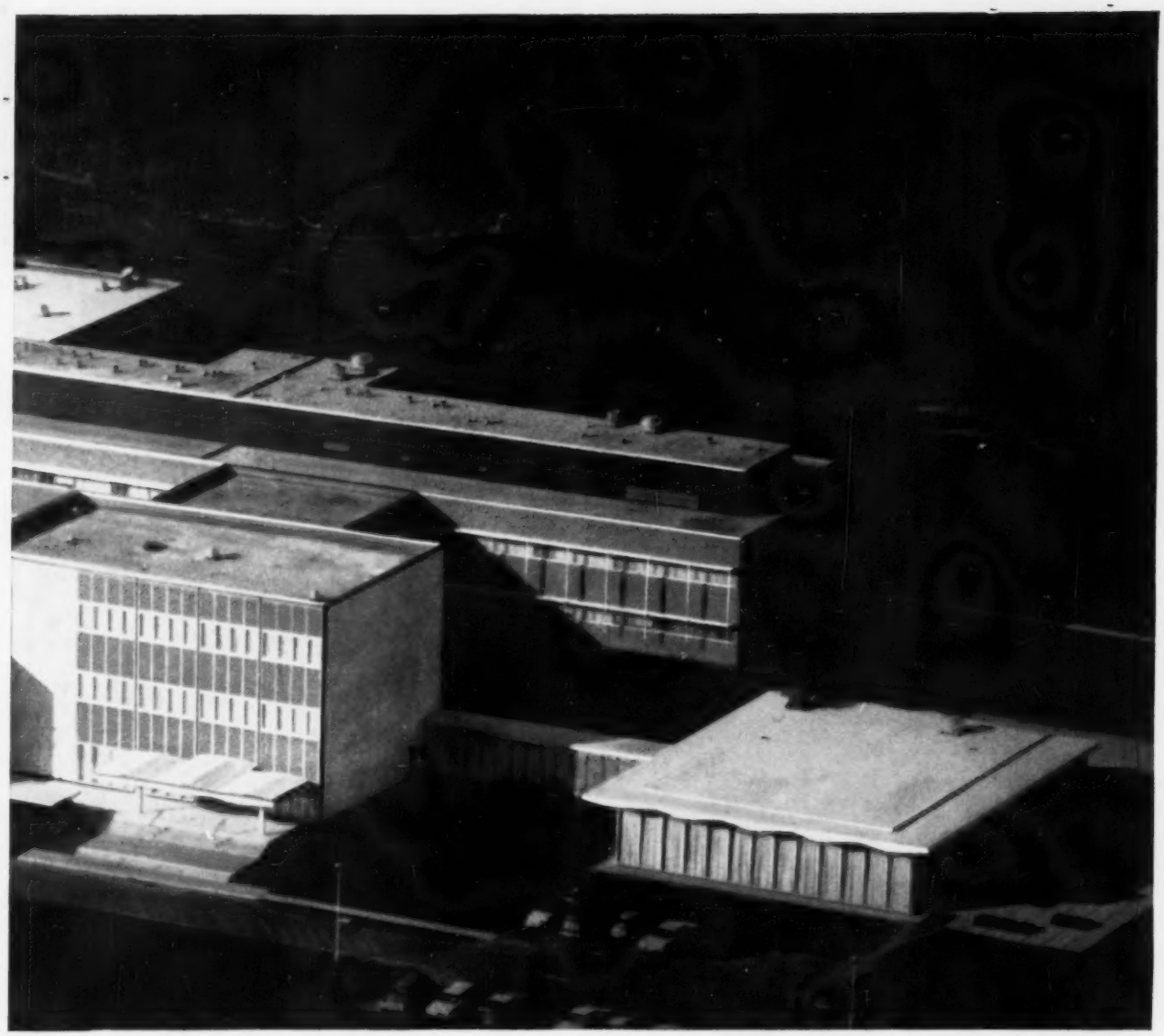
Ideas for new fibers. Ideas for making present fibers better. Ideas on dyeability. On new textures. On new fiber processing finishes. Ideas on new end uses and consequently new markets. Each of these fresh ideas will finally mean significant new opportunities for you.

Here we will also develop new techniques for making Chemstrand yarns. We will invent new and better test methods. And here, technical knowledge from the entire world will be examined for its possible use in your products and ours.

It's quite a program. But this is quite an establishment. 170 thousand square feet big! Facilities for over 500 scientists and technicians. Laboratories so complete that any experiment, no matter how elaborate, can be conducted. And a library that already includes over 37,000 technical books. Without question, the new

THE CHEMSTRAND CORPORATION • GENERAL SALES OFFICES: 350 FIFTH AVE., NEW YORK 1, N. Y.
DISTRICT SALES OFFICES: 350 Fifth Ave., New York 1; 3½ Overwood Rd., Akron, Ohio; 197 First Ave., Needham Heights, Mass.; 129 West Trade St., Charlotte, N. C.; California Office: 707 South Hill St.,

For further information use Handy Return Card, Page 155



. . . to develop better products for you tomorrow!

Chemstrand Research Center is one of the most significant developments in the history of man-made fibers.

Before erecting this new center, Chemstrand considered over 21 different sites. The Research Triangle Park in North Carolina was chosen because it possesses the proper atmosphere for research. It is in North Carolina's famous "Research Triangle" of Raleigh (home of North Carolina State College), Chapel Hill (home of the University of North Carolina) and Durham (home of Duke University). For scientists and technicians, there is no area in America that is more intellectually stimulating. And for their wives and children, there is no area that is more beautiful.

We don't know yet what wonders will come from this. But when they do come, you can be sure they will improve your business and ours.

Chemstrand Research Center, Inc.
Research Triangle Park,
North Carolina

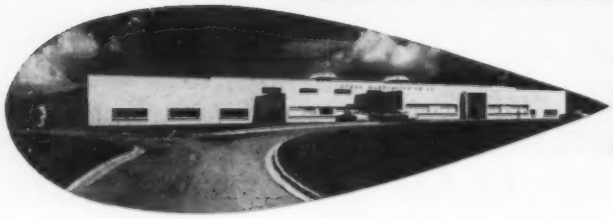
Wholly-owned subsidiary of The Chemstrand Corporation.

Los Angeles 14. Canadian Agency: Fawcett & Co., 34 High Park Blvd., Toronto, Canada • PLANTS: ACRILAN® ACRYLIC FIBER—Decatur, Ala.; CHEMSTRAND® NYLON—Pensacola, Fla., and Greenwood, S. C.

End of the Line for *Lint*

Bank of Auto-AIRMATS on one of the four air conditioning systems (totalling 138,000 cfm) serving the Stone plant. Filters installed overhead to conserve floor space.

Air conditioning system designed by DEPARX STIMSON, Winston-Salem, N. C.; installed by BUENSOD-STACEY, INC., Charlotte, N. C.



Auto-AIRMAT Filters Assure Lint-Free Air For Stone Manufacturing Company

The "Creators of Stone's Wear Apparel" made sure that lint in recirculated air would never hamper production of their quality line of petticoats and children's play clothes. They equipped their Greenville, South Carolina plant with AAF Auto-AIRMAT filters —the *only* filters designed to remove lint fibres from the air and clean themselves, at the same time!

The AIRMAT media, installed in roll form at top of unit, becomes a moving filter curtain that is rerolled at bottom with its lint load. Clean media is introduced automatically, and the lint is wrapped up in the roll for easy disposal. Get all the facts about the Auto-AIRMAT. Call your local AAF representative, or write direct for Bulletin 234. Address: Mr. Robert Moore, American Air Filter Company, Inc., 275 Central Avenue, Louisville, Kentucky.

American Air Filter

BETTER AIR IS OUR BUSINESS

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Improve quality–

lower handling costs with...

GLOBE®
easy flow starch

WRITE OR PHONE *Corn Products for expert technical assistance...*
helpful data on these fine products for the Textile Industry:
GLOBE® · EAGLE® · FOXHEAD® · TEN-O-FILM® · CLARO® · CRESCENT® starches · GLOBE® · EXCELLO® dextrines.

CORN PRODUCTS COMPANY INDUSTRIAL DIVISION · 10 East 56 Street, New York 22, N. Y.

GILLING AND BLENDING ?

Warner & Swasey M-3700 Pin Drafter® gives these important benefits

HIGHER CAPACITY and PRODUCTIVITY

- Can feed in up to 50 oz. per 5 yds., delivering up to 12 oz. per 5 yds. at rate of 1500 faller drops per minute.

MAXIMUM FLEXIBILITY

- Produces blends of from 5% to 10% up to 80/20. Can blend natural/natural, synthetic/synthetic, natural/synthetic, dye house work blends, other combinations.
- Applicable to French, Bradford, American or Jute Systems, card room, dye house or any operation where a heavy-duty gill is required for uniformity and parallelization of sliver at increased production.

IMPROVED QUALITY

- Use of 5/16" pitch faller screw provides close fiber control for short staple fibers in a wool diagram.
- Nip roll can be moved in to within 1 3/16" or out 1 11/16" from fallers—provides flexibility and close nip control on fibers from 2" to 9".
- 3-roll draft system eliminates apron soft spots, unevenness, etc.
- Flat pinning prevents fiber build-up, provides easier drafting, helps eliminate hard ends and lowers pin maintenance.
- Delivers larger packages—up to 50 lbs., can or ball. Permits longer runs with fewer piecings.

GREATER VERSATILITY

- Adaptable to various attachments and deliveries ranging from 15" to 24" diameter can delivery, ball delivery of 12" to 18" length of ball up to 24" diameter, or fully automatic can and ball delivery.

TOTAL RESULTS—uniform weight and blend • better parallelization of fiber • reduced waste and noilage • improved efficiency • lower maintenance costs • built-in quality control on subsequent operations.

Warner & Swasey offers the most complete line of pin controlled drawing equipment available. Whatever your drawing requirements may be, a whole new field of *profitable operation* is opened up by the Warner & Swasey PIN DRAFTER® Intersecting Draw Frame.

®REG. U.S. PAT. OFF.

TEXTILE MACHINERY SALES OFFICES

Main Office, Factory and Export Sales: 5701 Carnegie Ave., Cleveland 3, Ohio • P.O. Box 215, 20 Chestnut St., Needham 92, Mass. • P.O. Box 4000, 624 Pecan Ave., Charlotte 4, N.C. • Suburban Square Bldg., Ardmore (Philadelphia), Pa.

W S ®

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY

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PERSONAL NOTES

(from page 42)

Mr. Wallner
Magnet Mills

Mr. Campbell
Combed Yarn Assn.

Eugene T. Barwick, founder of E. T. Barwick Mills, Inc., carpet manufacturers, was recently named to the Silver Anniversary All-American team by *Sports Illustrated* magazine. To be nominated by his school, a man must have been a senior in the 1935 varsity football squad and 25 years later have shown the greatest accomplishments in public service and his career.

T. H. Holcombe, superintendent of the Winfield (Ala.) Cotton Mills, a division of Union Underwear Co., has also been named superintendent of the Fayette, Ala., facility.

Charles F. Crowell, formerly associated with Sayles Finishing Plants, Inc., has been named to supervise a new department of Kenyon (R. I.) Piece Dyeworks.

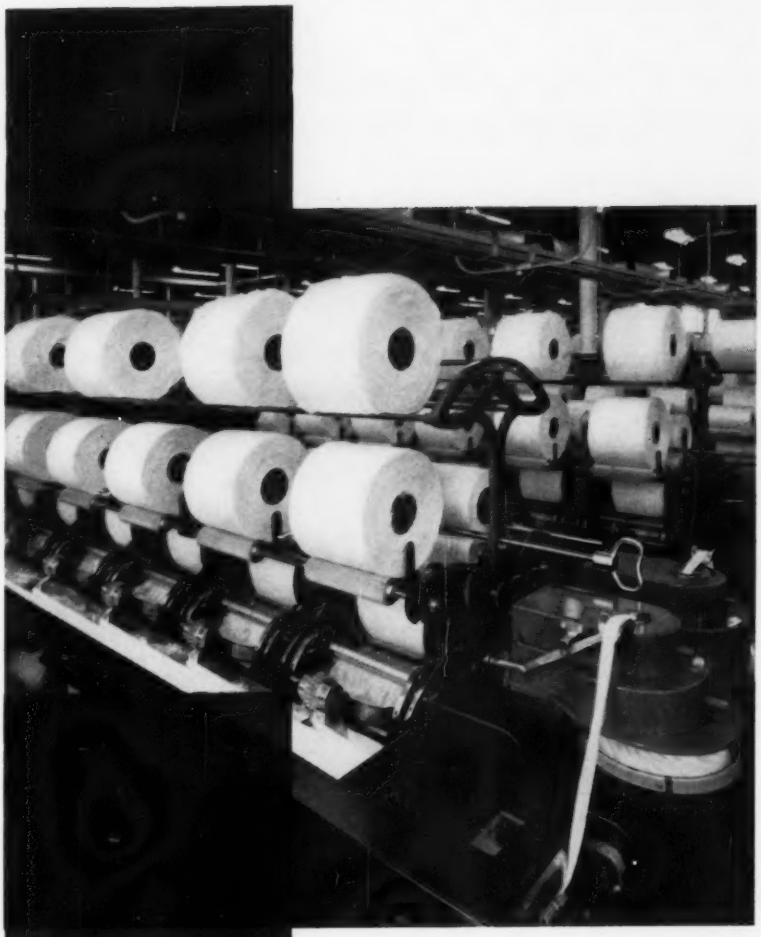
Craig E. Falk, formerly assistant plant manager of the Owensboro, Ky., plant of Dewey and Almy Chemical Division of W. R. Grace & Co., has been promoted to manager of the Adams, Mass., plant.

Milton K. Emerson has accepted the position of vice-president in charge of plant operations at Housatonic Dyeing & Printing Co., and Hull Dye Works, both located in Derby, Conn.

Jon Wallner, Jr., formerly plant superintendent of the Chattanooga, Tenn., facility of Davenport Hosiery Mills, Inc., has accepted the position of vice-president of Magnet Mills, Inc., Clinton, Tenn.

James Harry Campbell has been named executive secretary of the Combed Yarn Spinners Association with headquarters in Gastonia, N. C.

Continued on page 167



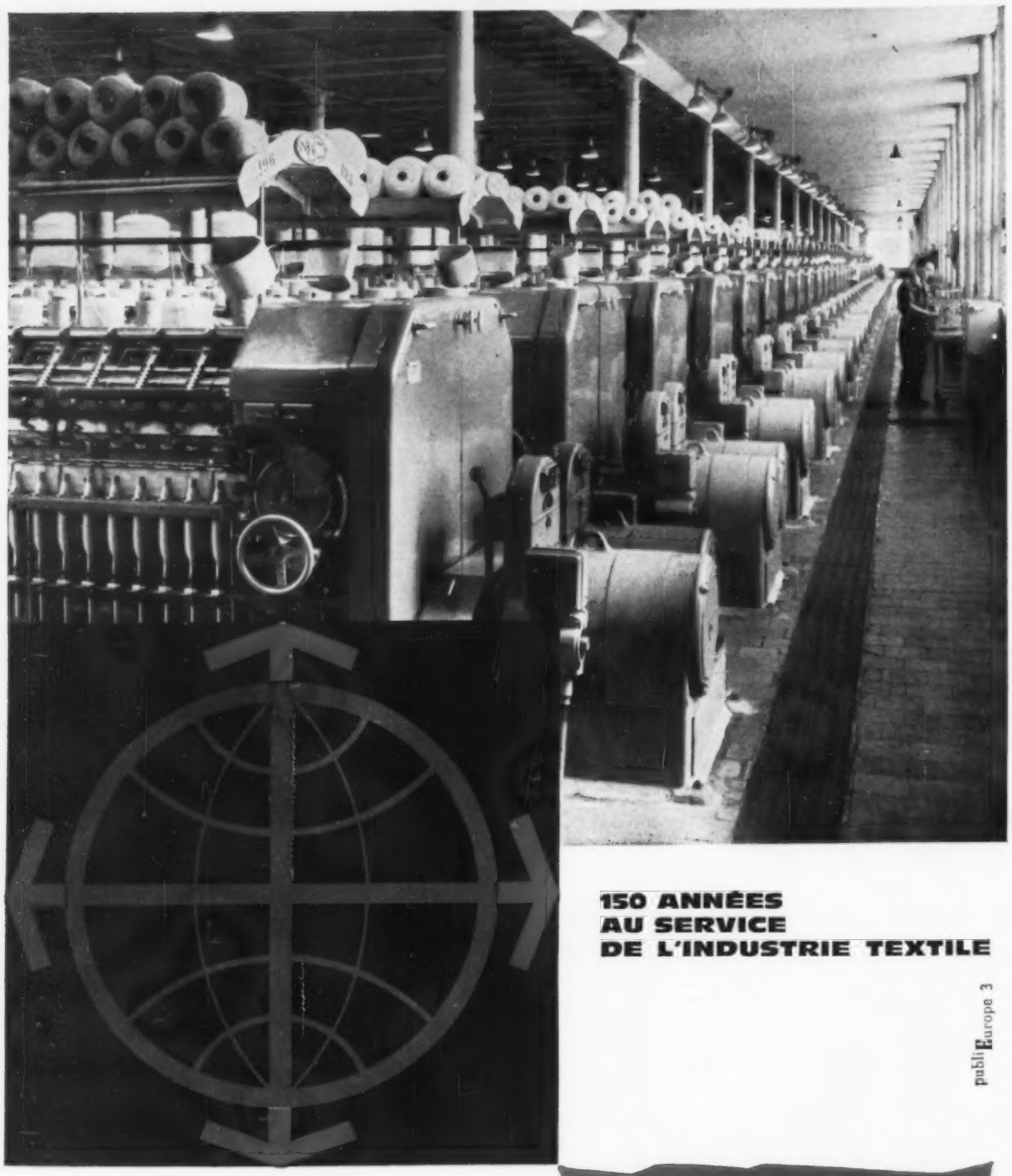
Sauce for the Gander?

Like most, you probably have a number of machines on your production line that were equipped from the start with Bijur Automatic Lubrication. If so, you've probably noticed that these Bijur-equipped machines cost slightly less to maintain and are slightly better producers than most of their neighbors. On one machine, of course, the difference may be small. But multiplied by the total number of machines on your production line, the difference becomes one that your Cost Accounting will spot just as quickly as your machine operators.

And it can be done. Bringing every machine up to par with a Bijur Lubricating System is a lot easier than you might expect. Inexpensive, too. Why not write today for complete information on how (and for how little) Bijur can be added where needed?

BIJUR LUBRICATING CORPORATION
155 West Passaic Street • Rochelle Park, New Jersey
Pioneers in Automatic Lubrication 4215

All over the world



150 ANNÉES
AU SERVICE
DE L'INDUSTRIE TEXTILE

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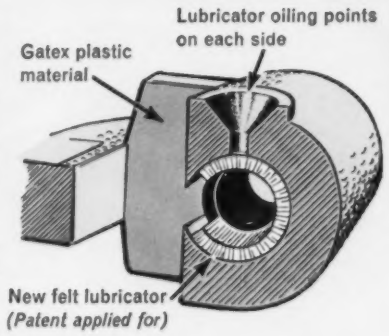
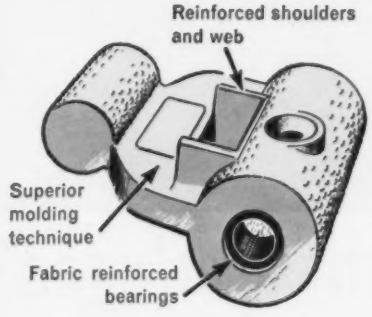
Another product in Gates complete line of Textile Accessories



Exclusive new Gates features!



Latest advance
in plastic drop box pickers!

Less wear on picker bearings and spindle —New felt lubricator (patent applied for) stores oil and dispenses it at an even rate on the spindle rod . . . provides long-lasting lubrication . . . cuts lubricating time. New fabric-reinforced bearings reduce friction and heat and extend the service life of the Gates picker, reducing down-time and replacement costs.

Longer life for picker and stick — All stress points on the shoulders and web of the Gates picker have been reinforced and strengthened for the entire picker stick stroke. As a result there is a minimum of web and shoulder splitting and the picker lasts longer. The wider shoulder design also results in considerably longer picker stick life.

Greater picker impact strength — Gates reversible drop box pickers are made of new Gatex plastic—a dense material highly resistant to impact. They are formed through special molding techniques that eliminate internal stresses, increasing picker life.

These exclusive new Gates features, together, give you longer picker life, and reduced spindle rod and picker stick wear. For complete information, call your nearby Gates Distributor.

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates Distributors are in the YELLOW PAGES

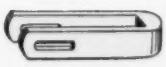
Gates®
The Mark of Specialized Research

Take-up Roll Coverings
Card Bands
Cone and Evener Belts
Spinning Frame Drives

Gates Textile Accessories

Tex-Hide and Vulco Loop Pickers

Tex-Hide Harness Straps


Thin-Tex, Vulco, Tex-Hide and SuperTex-HideLugStraps

4-in-1 Check Straps
Multi-Check Straps

TPA 904

He's using a tougher yarn . . . why aren't you?

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GOLDEN caprolan NYLON FOR THE 60's

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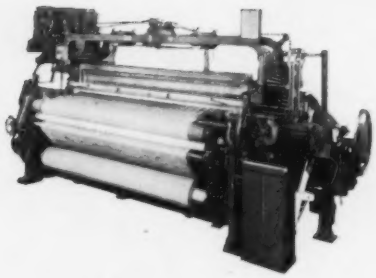

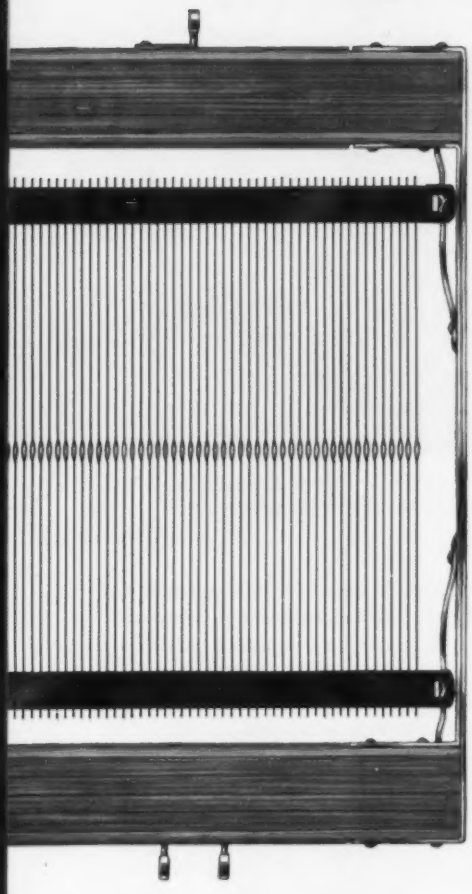

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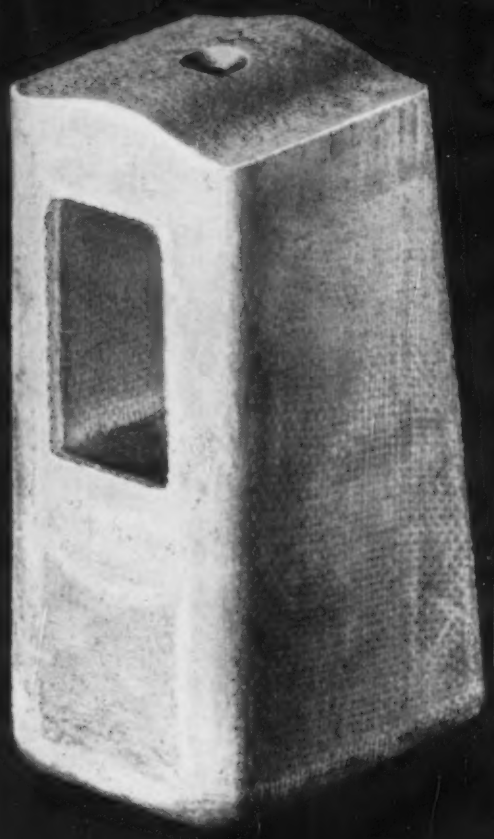
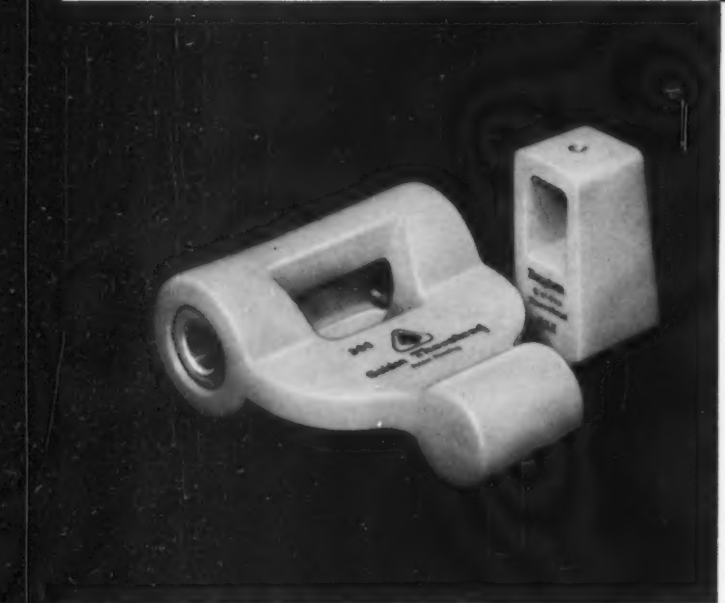
a Thorobred Picker to handle any assignment!



1. Dayco Thorobred Premium Loop Picker, readily identified by its gold back . . . rugged and always reliable.



Newest of Dayco's Thorobred Drop Box Pickers is the Golden Thorobred, fully molded in one piece from an ultra-high molecular polyester. Careful in-use studies show that its life expectancy is 10 times that of the conventional picker. If you've used the Golden Thorobred Drop Box Picker and liked it, you may wish to try the Golden Thorobred Loop Picker, now available in many sizes.

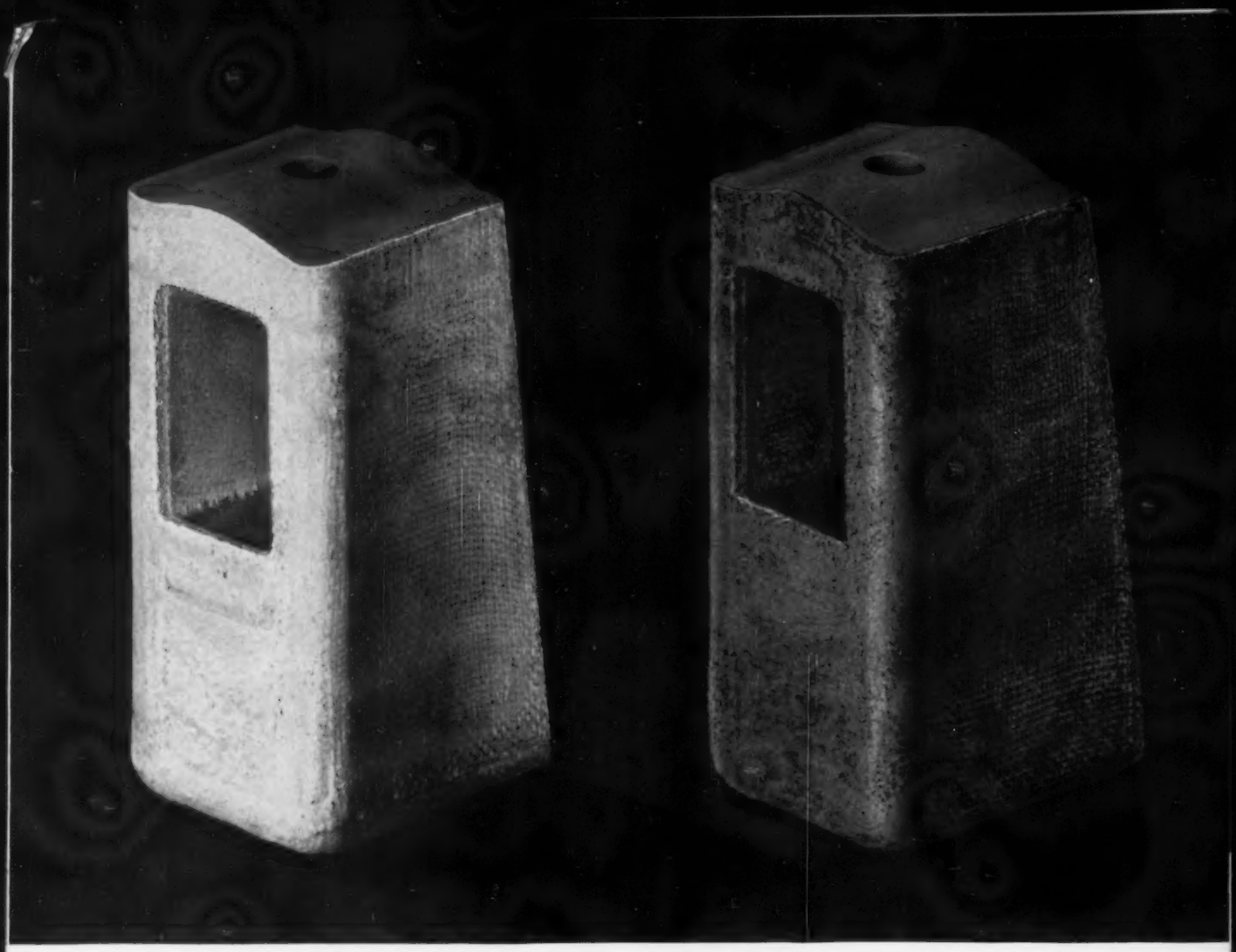
Meet the full family of Dayco Thorobred Loop Pickers! With their help, you'll substitute high production levels for the down-time so often resulting from picker trouble. You'll see the difference in cloth quality that superior picker performance can make. And you'll see a big difference in *quantity*, too.

First, the Dayco Premium Picker. It's really rugged —so sturdy and resilient it amazes even experienced mill men. Once they've become accustomed to its superior performance—even in operations that require the very best—they're sold on Dayco Premium! And little wonder. Keeping perfectly in time through millions of picks, the Premium stays on the job far past normal time for replacement.

Bring On Your Toughest Assignment

Perhaps the best way to explain what the Dayco Premium Picker can do is simply to say: bring on your toughest assignment. See the way that this quality loop picker will tackle it. You'll like what you see.

A second outstanding loop picker from Dayco is the Dayco Thorobred Super. Very likely you're already familiar with the Super, for its record of fine



2. Dayco Thorobred Super Loop Picker, white with red back . . . designed with modern loom requirements in mind.

3. Dayco Thorobred Standard Loop Picker, black with red back . . . for excellent service on E model looms and slower.

performance comes into the conversation almost as often as textile men talk shop together.

Like the Dayco Premium, the Super is fully able to cope with the demands of modern weaving equipment. It's able to withstand the weight of heavier plastic shuttles . . . it's at home with longer quills and higher loom speeds. Use the Dayco Thorobred Super Loop Picker and see if you don't agree: its ability to withstand the continual thrust of the shuttle—without loosening or early wear—is truly impressive.

Pay For What You Need

Economy of operation dictates, of course, that you pay for no more than you need. Yet, even where less is required of a picker, it must fully measure up to what *is* required, or "economy" turns into expense and waste. Dayco again supplies the answer: the Dayco Thorobred Standard Picker, recommended for E Model and slower looms.

Like the Premium and the Super, the Dayco Standard Picker is built in one piece. There's nothing to break or distort when it's driven onto the stick. And, like all Dayco Thorobred Pickers, the Standard gives perfect shuttle contact. The picker-stick hole is slightly tilted. The flared bottom permits easy, accurate seating. And the Standard stays exactly in position, for perfect alignment with the shuttle.

Pick a Dayco Picker

How can a lower-priced picker offer so much? The answer is simple. Dayco engineers design *each* picker to measure up to the demands that will be placed on it. But the same basic principles . . . procedures . . . and precision that help make the Premium as good as it is are adhered to in producing *every* Dayco picker.

Premium, Super and Standard, they're available in many sizes, to meet every possible requirement. So to pick the picker that's best for any given operation, simply contact your Dayco jobber. Or write or phone Dayco Textile Products Co., 401 S.C. National Bank Bldg., Greenville, S. C., for further information. Overseas Plant: The Dayton Rubber Co., Ltd., Dundee, Scotland.

Dayco TEXTILE PRODUCTS CO. Dayco

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Technical service of this type is an added benefit when you buy from Sonoco. ***Only Sonoco,*** in its field, provides the continuous research, product development, and integrated manufacturing needed to meet the ever-changing techniques of the textile industry. Let Sonoco's more than 60 years' experience help you!

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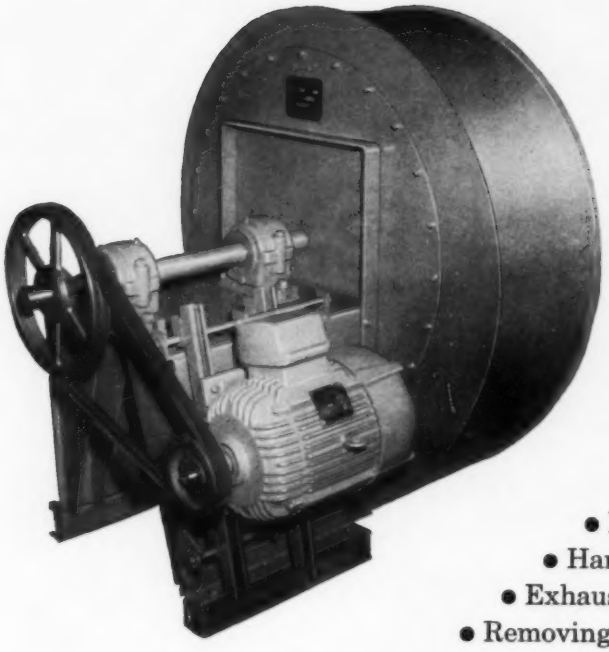
HOW TO HANDLE SOME OF THE MOST

PUNISHING AIR JOBS



IN THE MILL

- Moving hot gases.
- Handling materials in conveyor systems.
- Exhausting corrosive fumes.
- Removing dust-laden air.

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Wherever you find a punishing air job in a textile mill, you're very apt to find a hard-working 'Buffalo' Industrial Exhauster at work. Available with highly efficient air wheel (type AW), front-flanged material wheel (type MW), or open material wheel (type OW) without front flange.

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Next time you have a tough air moving job, call in your resident 'Buffalo' Engineering Representative. He has the experience to recommend the right fan for the job.

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'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

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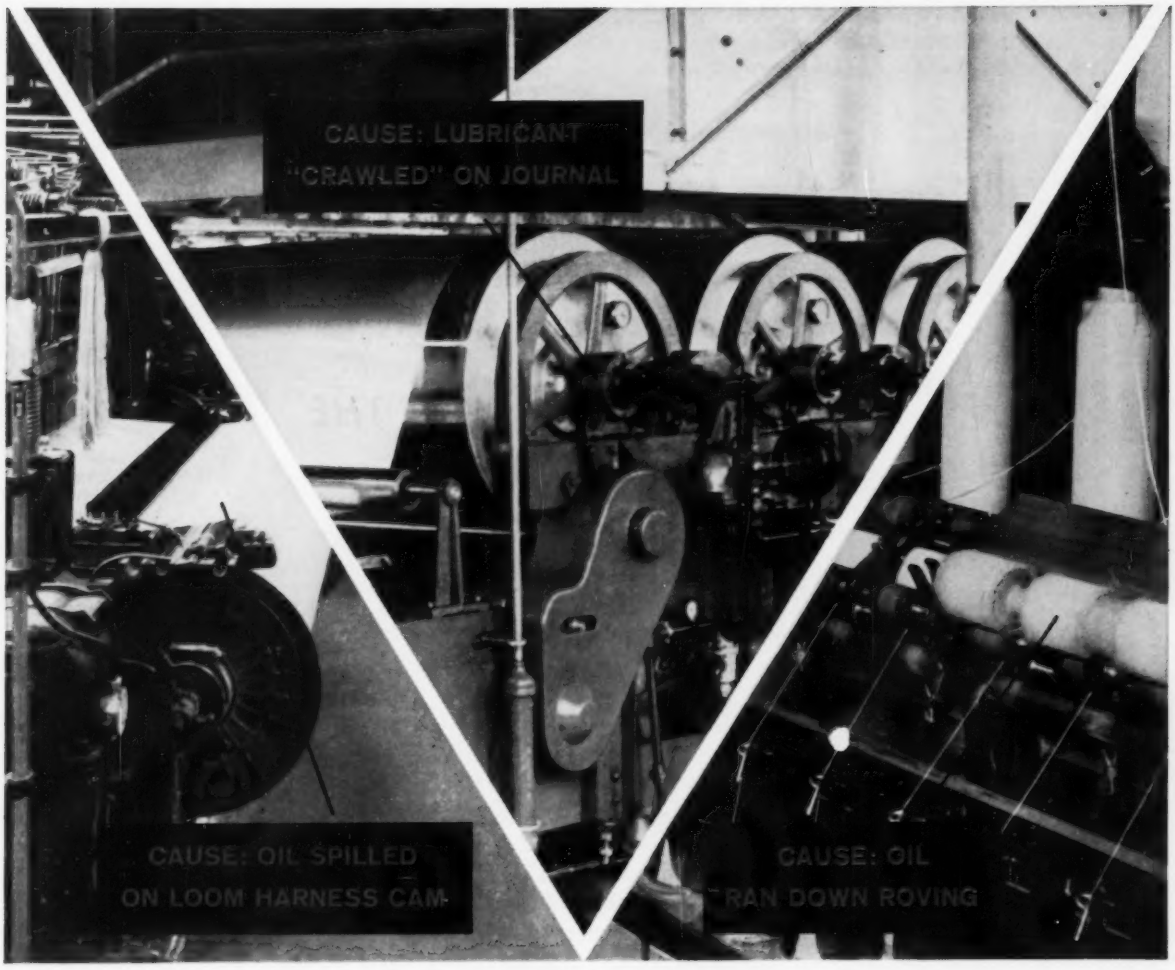

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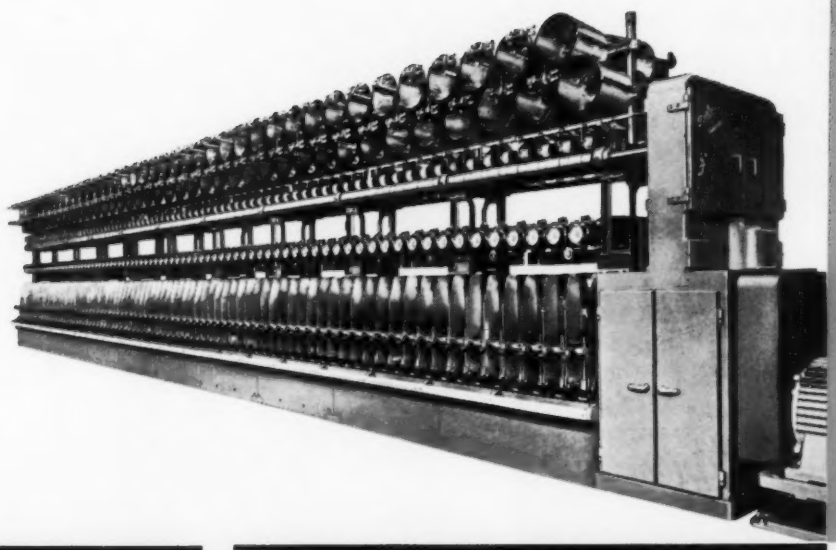

The Rieter draw twister J 5/5 for fine filaments up to 300 deniers ensures an increased output, due to the high delivery speed attainable with a spindle speed of up to 10,000 r.p.m. For both types, the self-lubricating rings can be depressed singly or collectively, allowing the build-up of cops without undrawn material and permitting various methods of operation.

Rieter 1523

J 5|6

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J 5|5

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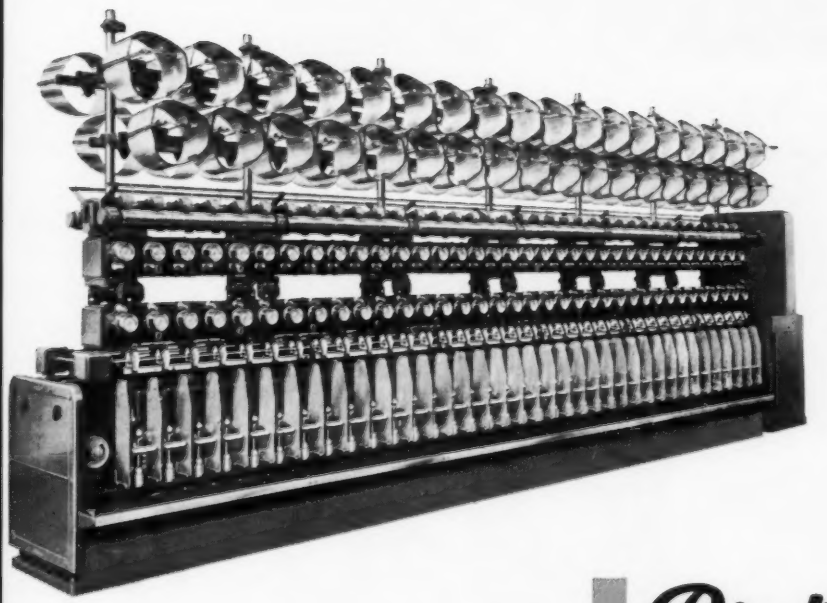

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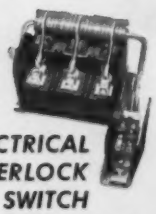
All these Square D features make this

THE SAFEST, MOST RELIABLE COMBINATION STARTER

VISIBLE BLADES You can see the switch is open and know you're safe!



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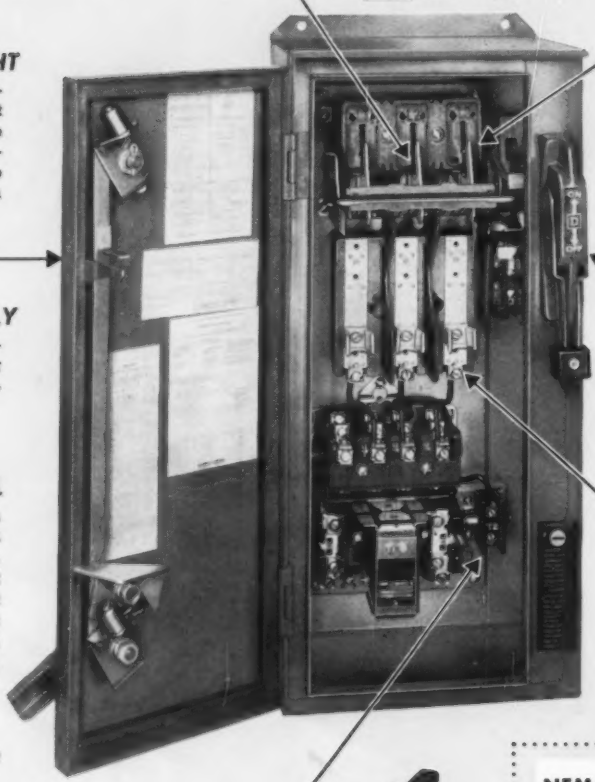

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Textile Industries
MARCH 1961

Research pays Narricot

by making it a leader in narrow fabrics designed and finished for specific uses

Staff prepared Exclusive

THE NEW fibers and chemical finishes that have been developed in the last twenty years set into motion an era of endless technological change. Few industries have prospered in this era without benefit of new technologies and new concepts of manufacture and finishing. Fewer still can hope to meet future demands without the direction of organized research.

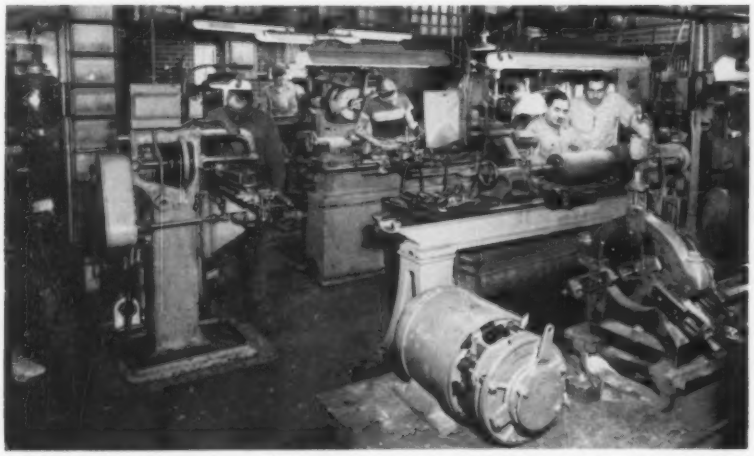
Among industries that have been making a successful transition to this changing era, the woven narrow fabrics industry has appeared least in the public eye. Yet it has been gaining stature, largely through the developments of such research-minded firms as the Narricot Corp. of Philadelphia. In recent years, this growing, medium-sized company has entered new fields with fabrics, tapes, and webbings, many of special design and finish. Its major efforts have centered on projects for military and industrial fields, but not to the neglect of a diversified line of civilian and household products, which have long been the company's life blood.

Among textile firms of Narricot's size, organized research is not common. For one thing, it requires special management skills and a budget for research talents and facilities. Moreover, there is no assurance that even the most soundly researched product will bring back the anticipated financial return. To be sure, research offers a promising road to profits but the risks tend to be high.

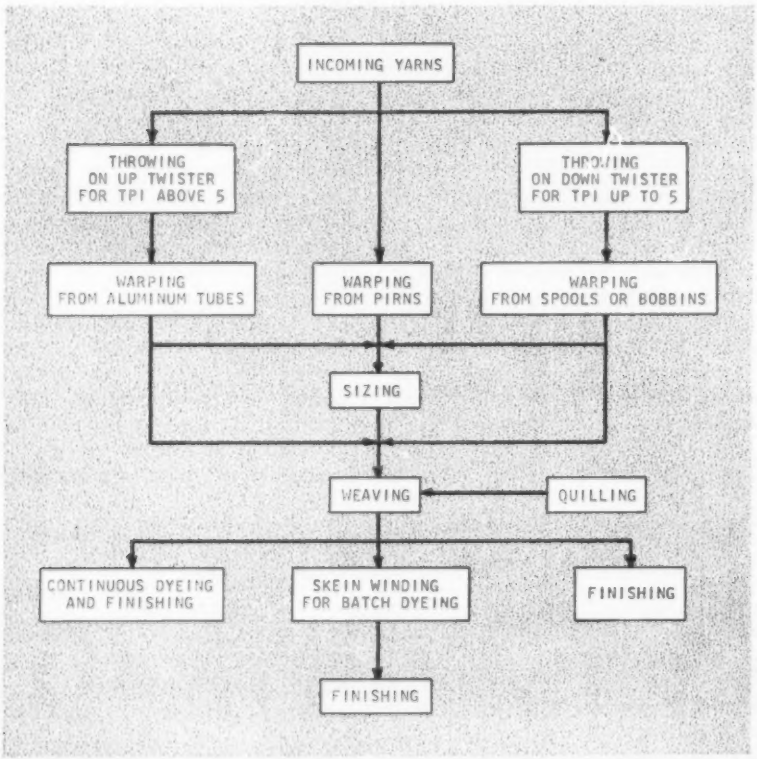
It was not without knowledge of these realities that Narricot's president, Jacob Serbin, led his company into research, for he had himself spent eight years in the complex activities of chemical product development. But before he made the move, he set about organizing a research staff, and introduced modern manufacturing techniques for a diversified production. Meanwhile, he assured himself that his company could afford the luxury of research by building up the sales volume of fabrics for the more traditionally stable markets.

It might be of interest to trace

With construction of this plant before war's end in 1945, Narricot entered a new era of woven narrow fabrics manufacture and finishing. After 15 years of operation, in a period that has seen much technological change, the plant design can still be considered modern.



Much of Narricot's weaving and finishing equipment is built in mill by 30 experienced machinists in a well equipped shop. Equipment is designed for flexibility and quality rather than speed. Preventive maintenance and lubrication are full time jobs for part of staff.



some of the preparation and growth which led to Narricot's present state of diversification.

Modern Plant for a New Era. During World War II, Narricot's entire output of tapes and webbings was going into military uses. Its plant was old and multi-storied, unsuitable for a more efficient lay-out of manufacturing operations. It became obvious, as the war went on, that a new building was needed as assurance that Narricot's part in the common effort would not be impaired. In 1945, just before war's end, a modern, one-story plant was built along new concepts of equipment lay-out and narrow-fabrics manufacture. With the construction of this plant it might be said that Narricot severed its ties with the past, for shortly thereafter the war came to a close and the industry entered a new era.

After 16 years of operation, during a period that has seen much technological change, the plant can still be considered of modern design. The largest area of its square design is devoted to warping, sizing, and weaving. These operations are located within easy trucking distance of each other. Quilling and skein winding operations occupy the least area, having felt the pinch of the company's growth. In fact, skein winding equipment is of two-tier construction for conservation of space. The final operations, dyeing and finishing, are housed in an adjacent walled-in area, which occupies perhaps 25% of the manufacturing space.

Perhaps the plant's outstanding piece of auxiliary equipment is the air conditioning unit, in which management invested heavily, which controls humidity and temperature within a very narrow range. The chief benefit of such precise control of humidity, maintained between 58-60% rh, is peak weaving efficiency from day to day. However, to take full advantage of this precise temperature and humidity control an exacting standardization of warp-sizing is essential, since any fluctuation in humidity influences moisture absorption by the yarn and sizing materials, which in turn affects the weaving quality

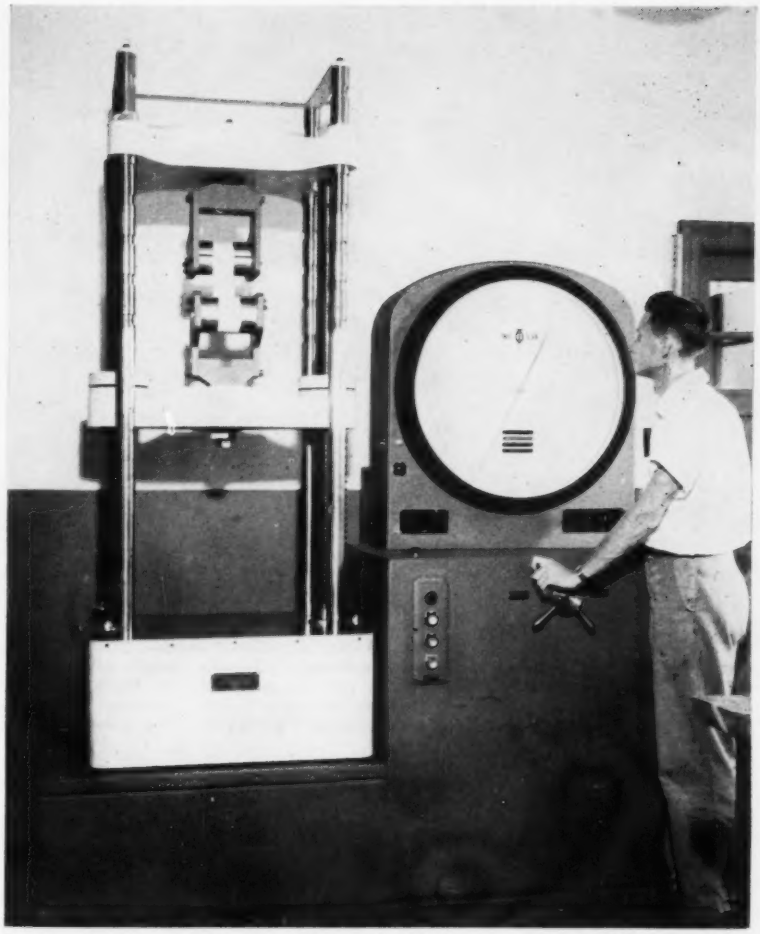
and efficiency. Thus the higher expenditure for better air conditioning has been paying off for Narricot.

From the beginning, a machine building program has been under way. It has been concentrated chiefly on the design of weaving, dyeing, and finishing equipment. Such a program has not only been found necessary to meet diverse production goals, particularly in weaving, but it has also realized the company appreciable savings over the years. No doubt, equipment to suit Narricot's requirements could be built by outside firms; but this often results in delays.

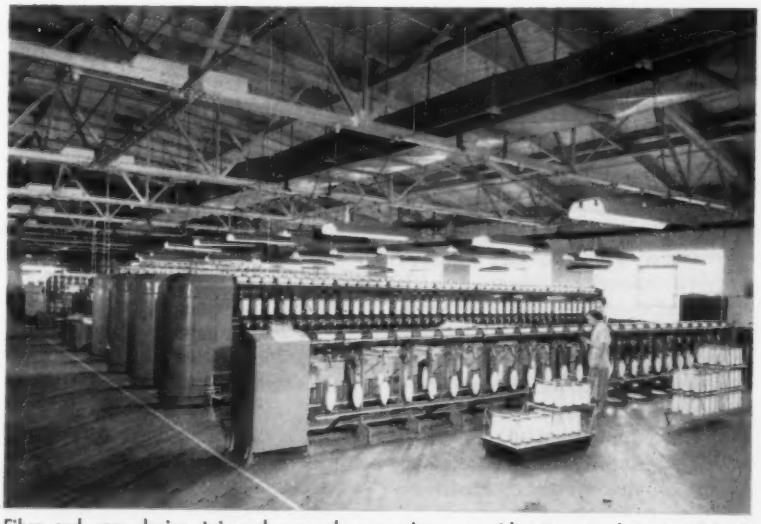
At the time of this writing, several building projects were coming to completion. Part of the experienced 30-man maintenance crew, which consists of machinists, electricians, welders, metal-smiths, and millwrights, was rushing the assembly of a curing range; another group was assembling a set of newly designed looms. Machine building has taken on aspects of a research activity, and Narricot's looms reflect continual improvements in design, the result of working toward clearly defined goals over long periods of time. These goals are dictated by a wide fabric range. Thus, high productivity is subordinate to weaving flexibility and quality.

A similar building program is under way for the dyeing and finishing operations, in which part of the equipment required is purchased from outside machinery firms. There is a continual program, however, for the improvement of continuous dyeing and finishing operations, which will be discussed later.

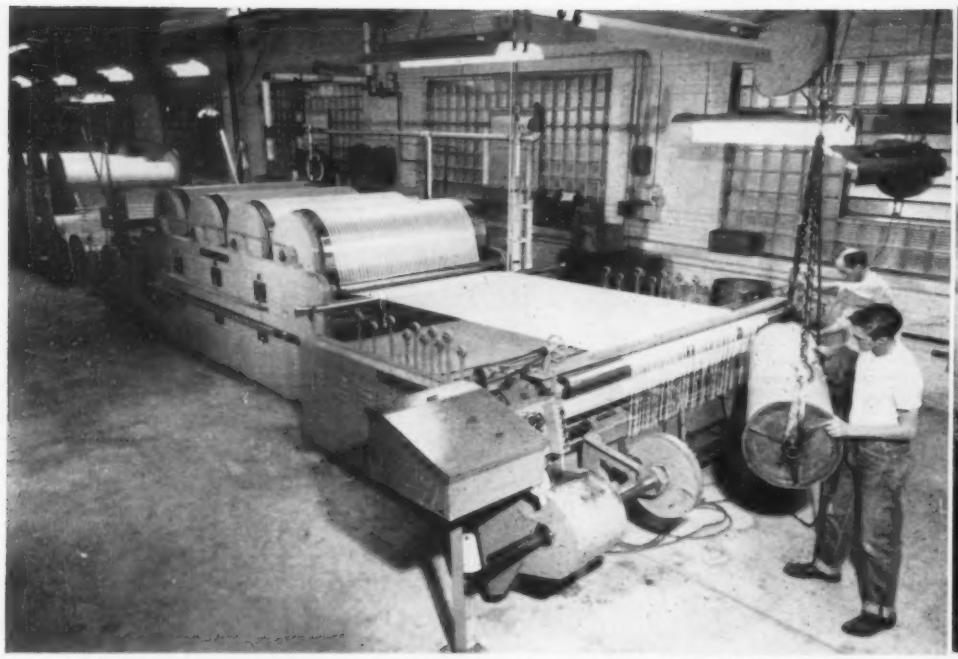
From the flow sheet illustrated on these pages, the scope of Narricot's equipment and production facilities can be visualized. Not all of the operations listed are carried out in the Philadelphia plant just described. Some years ago, as the diversification and expansion program gathered steam, additional plant facilities were acquired in Fullerton, Pa. Here the operations include throwing (for needs of both plants) and all other steps essential for producing heavier weight fabrics for military and industrial purposes. Here, too, are

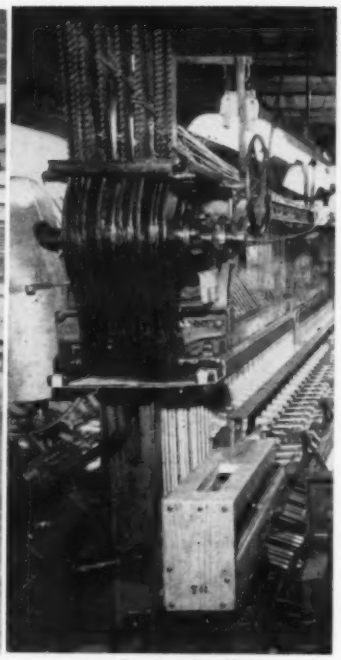


The transition to organized research has enabled Narricot to enter new fields with fabrics of special design and manufacture. A sound testing program is regarded by management as the vital means for measuring progress in research, and is the full-time responsibility of a technical staff in the firm's Fullerton, Pa., laboratory. Technician here is operating an electromatic tensile tester capable of measuring fabric strengths from 60 to 60,000 lb.



Fiber and yarn denier, tpi, and yarn ply are primary considerations in designing fabrics and webbings for specific end uses. Rayon, nylon, acetate, and polyester are the chief fibers used. Narricot's throwing division at Fullerton supplies the needs of both plants.





Left: Warp sizing formulations have been standardized for a specific amount of moisture absorption in an atmosphere precisely controlled at 54-60% rh. Result: peak weaving efficiency from day to day. Slasher shown is located in separate department of Philadelphia plant, adjoining warping and weaving operations for easy handling of beams. Center: Fabrics for military and industrial purposes now represent a growing percentage of Narricot's production, but not to the exclusion of fabrics for consumer uses. Flexibility in weaving

laboratory and testing facilities for guiding research and controlling quality.

Between the two plants approximately 1,000,000 lb of yarns are consumed annually in the manufacture of fabrics, tapes, webbings, and bindings, of flat and circular design, of varying construction, dimension, texture, and form. It is interesting to note that among current products there are many which did not exist on the company's list of salable items less than five years ago. These are the products of research.

New Fibers, New Finishes. Following World War II, industry began to exploit the scientific breakthroughs which a period of accelerated research had evolved. As new sciences became new industries they created huge demands for new products. For the most part the traditional materials, even with modification, could not provide the special properties that were now being sought. Even in the established markets the trend toward specialization began to catch hold.

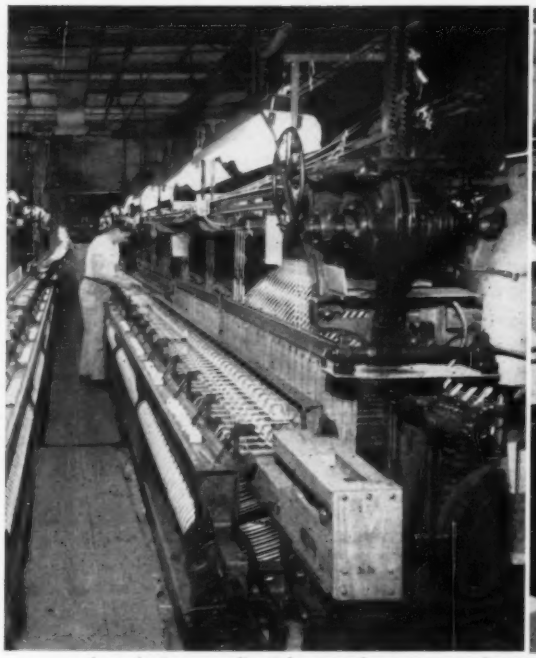
In the early 1950's, as new fibers and chemical finishes became available in quantity, Narricot began to organize research projects with specific markets in mind. In time, a working knowledge of the new fibers and chemicals was acquired and new developments came forth with some consistency. In the following paragraphs, some of these developments and the uses they serve will be described.

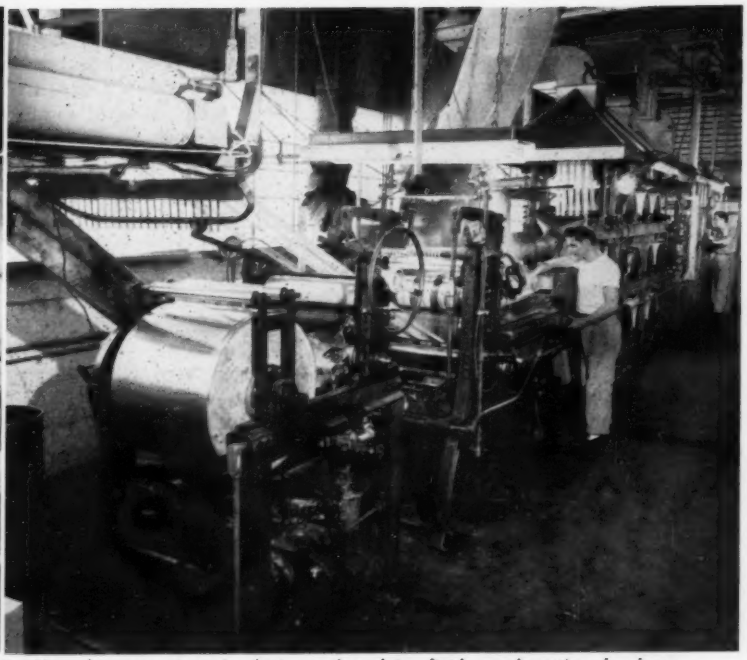
Among the research works which presented some challenging problems along the way, were several projects for the Air Force and other branches of the Armed Services. One such project, soon to be published, which required a year of concerted effort, is entitled "The Design and Evaluation of Heat Stabilized Tapes and Webs." This project was sponsored by the Nonmetallic Materials Laboratory of the Wright Air Development Division and concerns the physical properties of heat-stabilized nylon and Dacron tapes and webs.

Another interesting project centered on the development of a cargo webbing for use as netting by the maritime industries. Nylon was selected primarily for its favorable weight/strength ratio. A webbing of 1" width, for example, offered a breaking strength of 4,000 lb, while a webbing of 1¾" offered a breaking strength of 6,000 lb. The webbing is so woven that at regularly spaced points it provides an opening for a webbing of similar dimension to pass, thus affording a netting as loose or as tightly interlaced as conditions of usage demand. The nettings can be dyed in different shades to identify their weight limitations.

This development perhaps best illustrates some important advantages of nylon over traditional fibers: resistance to chemicals, moisture, and mildew, and higher strength with less bulk.

A third project resulted in the development of an ironer tape called "Narri-Last" for use in commercial laundries. Traditionally, cotton is used for this purpose, but it has several disadvantages. First, its life span is short, and it offers no efficient means of splicing, in replacement or repair. This contributes to a higher cost of production through loss of time. To overcome this basic shortcoming of cotton tapes, Narricot developed a new tape, woven of Dacron, which outlasts the cotton tapes in actual usage tests by as much as 10 - 1. To facilitate splicing, Nar-





and emphasis on quality take precedence over productivity. Normal weaving rates range between 200 and 240 ppm, depending on fabric construction. Right: Chemical finishing provides the additional properties which fabrics for special uses must have. Narricot's research in developing and applying finishes and coatings has been an important key to its diversification. Dyeing and finishing are often carried out in sequence on a continuous range, as in the photo. Plans for a much improved range are now on the drawing-board.

ricot's engineering division perfected a portable welding unit, which heat molds the overlapping ends of the tape in seconds, thus achieving an endless tape with a smooth splice.

This is one example of coordination of mechanical and textile research to produce a technically correct textile material for a mechanical use.

As Narricot's experience in technical textiles widened, more and more requests for unusual textiles found their way to Mr. Serbin's desk. Many of these were technically or commercially unfeasible at the time, but all were carefully considered. In some cases, items of no immediate commercial value, which presented interesting possibilities, were studied at some length and results noted and filed for future reference.

For the Future. Nearly all fabric developments are dependent on sound dyeing and finishing technologies. They require proper application of color for identification or appeal, and they must be provided with chemical and physical properties, often with great exactitude. When a basic textile fiber will not furnish the desired properties, laminations, impregnations, or coating of special finishes must be applied to the basic tape. These technologies hold an important key to the future growth of narrow fabrics, and Narricot is devoting much development work toward improving them.

While the trend has been shifting toward application of dyes by continuous methods, some obstacles still remain to prevent accomplishing this ideal goal on a wider scale. The hydrophobic nature of certain man-made fibers and their lack of affinity for certain color classes still call for long dyeing cycles for better penetration and build-up of shade. Narricot's equipment is therefore of both batch and continuous types.

For batch dyeing, there are several Klauder-Weldon and Hussong machines, and a multi-compartment machine which enables many lots of small size to be dyed simultaneously.

Continuous processing equipment includes several dyeing and finishing ranges. There are facilities for curing chemical finishes, and heating elements are available for heat-setting fabrics up to a temperature of 900 F. On the drawing boards, however, is a new dyeing and finishing range of vastly improved design, which is the result of coordinated efforts between research, production, and mechanical engineering personnel.

Man Power: Vital Ingredient. Narricot is small enough to carry out research on an informal basis with easy communications existing between all levels. President Serbin takes a personal interest in research, serving as administrative head. But he relies heavily on his working partners and on a staff which has a combined experience of well over 200 years in the woven narrow fabrics industry. At the head of development and testing is a textile engineer, Herman Becker, now with the company more than 10 years, who reports to the president on the progress of individual projects.

Not the least important responsibility in running a flexible, multi-plant operation is personnel relations. This responsibility comes under the supervision of George DiGiorgio, a partner in the firm, who sports an M.S. degree in Psychology. His department has set

up an elaborate labor policy, in which the rights, privileges, and obligations of management and employees are clearly set forth in writing for the study of each incoming employee.

Specific details pertaining to such benefits as hospitalization, bonus, and vacation eligibility are fully explained to the employee before he is assigned his first job. He is also informed of his obligations and the violations that can lead to his discharge, and the privileges of seniority. Perhaps the outstanding feature of the industrial relations program at Narricot is that all decisions pertaining to employee policies are made by a board consisting of employee and management members.

Two other partners in the firm make up the well-balanced managerial team. Treasurer-comptroller Jack Sakim is a CPA of long experience who keeps Narricot on a sound and smooth financial keel. Gerald Elias, who chose textiles over the legal career for which he was educated, is vice-president and director of sales. His constant search for new products and new fields has helped to keep the Research Department under constant pressure.

It is this research that has played a chief role in Narricot's growth into a multi-plant organization. Though it still involves risks, and in all likelihood will always be regarded as a luxury by President Serbin, Narricot is nevertheless shaping much of its future around it. The research skills have now been acquired and the company can move with greater confidence into new fields of endeavor.

Technical developments *(from page 27)*

fects and end breaks and stops the warper to permit their removal. The operator can identify and remove the sources of interference through observation of signals continuously monitored on an oscilloscope screen. Utilization of the detector is claimed to virtually eliminate quality control problems in warping operations.

Producing Linen Yarns. A Dutch rayon yarn producer is adopting a new process of flax treatment, developed by the Fiber Research Institute at Delft, for the manufacture of linen yarns. A stronger yarn is said to be obtainable with shortened conversion operations.

FABRICS AND PRODUCTS

Nonwoven Graphite Felts. Development quantities of nonwoven felts of graphite and carbon are being made by National Carbon Co. The material exhibits no oxidation in air at up to 650-700 F, and strength doubles at 3,000 F. Some uses are expected in insulation, gas filtration, and in gasketing.

Cotton Concrete. The USSR Plastics Research Institute has reported the development of a new type of concrete in which a hydrolysis product of cotton bolls replaces conventional cement. Strength of the new concrete is claimed to be as great as that of steel, while compressive, tensile, and bending strengths are far greater than those properties in conventional concrete.

Paper-Nylon Dresses. Princess-style tennis dresses made of nylon-reinforced paper imported from the U.S. are being marketed in London. Currently priced at slightly over $2 each, it is expected that lower priced English materials and reduced manufacturing costs, probably eventually eliminating sewn seams, may bring the price down substantially within five years.

Nonwoven Carpet. An all-wool-face nonwoven carpet, called "Lana," is being marketed by a Dutch concern. The wool is anchored in a latex foundation by an "electronic" process, and the carpet has a woven jute backing.

Conveyor Belt. A conveyor belt construction developed for superior resistance to heavy impact, accidental damage, and mildew has been announced by B. F. Goodrich Industrial Products Co. Called "Nylock," the belt is a single layer of nylon and long-staple cotton, impregnated with rubber and encased in a rubber cover. It is claimed to have three times the tear resistance of equivalent strength nylon-filled multiple-ply belting.

Cordless Tires. One of the large tire and rubber companies reports experiments with the manufacture of a translucent polyurethane synthetic rubber tire which requires no tire cord. The material can be dyed to match car colors and is claimed to have good resistance to cutting, puncturing, and abrasion. Road tests have been made at car speeds up to 65 mph.

Fabric for Outer Space. Goodyear Aircraft Co. is reported to have reduced "Rene 41," a GE nickel alloy, to filament form and woven it into a metal cloth for use in outer space. A special impregnation provides resistance to leaking and high temperatures.

Cotton Batting Research. The National Cotton Batting Institute is planning to sponsor a research project to develop a cotton batt with increased resilience for specific-application performance.

Acrylic Nonwoven Fabric. A newly introduced interlining fabric composed of resin-bonded Acrilan acrylic fiber is claimed to provide a high degree of loft, giving maximum warmth with minimum weight. The bonded product is completely washable and drycleanable, and can be used with linings without quilting.

Seat Cover Standards. A quality definitions code for seat cover fabrics has been prepared and recommended for use by the Automobile Seat Cover Association of America.

New series . . .

■ This is the first in a series of articles in which Norbert Lloyd Enrick, well known author, teacher, and consultant, will discuss some of the newer tools and techniques available for use in managing a textile business. This article demonstrates the use of linear programming, a new planning tool for sales-production coordination. It is based on consulting experience in Linear Programming applications for several cotton, woolen, worsted, and finishing mills, but the principles are equally applicable to knitting and other textile plants.

Future articles in the series will deal with inventory optimization, process development, sales forecasting, market analysis, planning and analyzing mill experiments involving several variables, and related fields of management.

* MODERN TEXTILE MANAGEMENT

by Norbert Lloyd Enrick*

Exclusive

ALTHOUGH the recently developed new techniques of Linear Programming (LP) have, thus far, been introduced in only a few textile mill organizations, it is hard to visualize a spinning, knitting, weaving, or finishing firm which could not profitably use this management planning tool.

With L P, a mill can quickly evaluate its various product styles from a consideration of sales potential, unit profit, productive requirements, and plant capacity. From this, management can plan an over-all program, having as its ultimate goal the sale and production of those fabrics and fabric quantities which, by matching sales potential with plant capacity, will tend to maximize over-all profit. While generally the goal program is never attained fully, it is not unusual for L P to help raise over-all operating profits by ten to twenty per cent.

Illustration. In order to demonstrate how L P works, an abbreviated example, taken from the author's consulting experience, is presented in *Table 1*. For simplicity, only 8 of the approximately 80 mill styles were used here. For these 8 styles, shown as "C" to "J," the profits per 100 yards of fabric and per loom-hour are given in Lines 1 and 2, as provided by the cost department.

The data in Line 3, machine-hours needed to produce one hundred yards of fabric (or the equivalent sliver, roving, and yarn used in the fabric), are taken from actual production records, supplemented by time-study standards.

In the left-hand column opposite Lines 3a-d, the available mill capacity is shown. In this example, the standard mill week was 120 hours, so that with 216 cards the available mill capacity was 25,920 hours or (rounded) 26 thousand hours per week. Entries for roving, spinning, and looms are obtained similarly.

Line 4 gives the sales limit, representing an evaluation of the prospective maximum yardages of each style that the mill's present and potential customers may be expected to buy for their normal requirements. These figures are only estimates of varying degrees of reliability, but such forecasts are unavoidable in planning. While actual demand will deviate to some extent from expectation, the results will usually not seriously

*Associate Professor, University of Virginia Graduate School of Business Administration. This article is based on consulting work in Linear Programming for several cotton, woolen, and worsted mills, and two finishing plants.

TABLE 1. Linear Programming Problem and Maximum Profit Solution

Item	Marketable Fabric Styles								Mill Capacity in 1000 Hr/Wk		Maximum Profit
	C	D	E	F	G	H	I	J	Available	Used	$/Week
1. Profit, $/100 Yd	.400	.370	.360	.360	.350	.330	.280	.275			
2. Profit, $/Loom-Hr	.131	.171	.110	.118	.137	.108	.125	.084			
3. Mach-Hr Needed per 100 Yd Fabric:											
a. Cards	1.8	2.6	2.4	2.1	2.9	2.1	2.9	2.9	26		
b. Rov. Spindles	36.0	28.8	28.8	28.8	31.2	36.0	21.6	36.0	242		
c. Spin. Spindles	720	648	720	648	648	720	792	720	7,200		
d. Looms	30.6	30.6	32.6	30.6	26.5	30.6	22.4	32.8	250		
4. Sales Limit in 1000 Yd/Wk	500	300	100	200	100	400	400	400			
5. Optimum Sales, 1000 Yd/Wk	—	300	—	160	74	—	400	—			
6. Mach-Hr Used by (5), in 1000's, (3 x 5).											
a. Cards	0	8.8	0	3.4	2.2	0	11.6	0		26*	
b. Rov. Spindles	0	86.4	0	46.1	23.1	0	86.4	0		239*	
c. Spin. Spindles	0	1,944	0	1,037	480	0	3,168	0		6,629*	
d. Looms	0	91.8	0	49.0	19.6	0	89.6	0		250*	
7. Profit, $/Wk, (1 x 5)	0	1,110	0	576	259	0	1,120	0			3,065**

*Total of Lines 6a-d. Comparison with available capacity above shows cards and looms to be bottlenecks.
**Total of Line 7.
Source: Abbreviated actual mill data, courtesy Institute of Textile Technology, Charlottesville, Va.

detract from the value of the L P evaluation.

Seeking the Optimum. From the information summarized in Lines 1-4 of *Table 1*, a certain amount of initial planning is possible. The sales manager will often skip the unit profits in Line 1, turning his attention to the generally more meaningful data of profit per loom hour, noting that Styles C, D, and G exhibit relatively high profit listings. He must, however, also give consideration to the limitation on maximum sales in Line 4.

The production executives, in turn, will point out that some of the styles selected will affect mill balance adversely. In particular, the high loom-hour requirements of Styles C and D tend to create bottlenecks in weaving, while the high carding requirements of Style G tend to create bottlenecks in carding.

The problem-solving function of L P is to consider these sales and production factors, and to find that yardage quantity for each style which will reconcile the productive and sales limitations at maximum total profit. This is done in Line 5, showing the yardage requirements for maximum profit per week. Multiplying these yardages by the unit profits in Line 1 yields the potential dollar profits per week in Line 7, totaling $3,065.

The virtue of this total is the following: No other combination of fabric quantities conceivable will, under the production and sales limitations shown by Lines 1 to 4, yield a higher profit. While in actual selling and producing the goal thus established will not be met fully, there is a distinct advantage to knowing the absolute optimum and working towards it.

It is particularly interesting to observe that Style I, with a low unit profit of 28 cents and a loom-hour profit less than three other styles, should yet be made in quantities of 40,000 yards per week (the highest), thereby contributing the greatest profit of $1,120 per week (lines 5, 7). It is doubtful whether any one, looking at the profits in Lines 1 and 2 only, would have selected this style for maximum promotion.

The quantities in Line 5 are obtained mathematically, using techniques known as the "Simplex Method" of Linear Programming. In general, manual computations are lengthy, but an ordinary electronic computer can usually provide a solution for an 80 to 200 style problem in a matter of minutes. Where a firm does not have its own computer, the calculations can be accomplished quite inexpensively by commercial computing firms.

Using the L P Solution. The L P solution aids in planning and helps raise over-all profits, by presenting an analysis of the interlocking and interacting relationships of sales and production factors to management. Based on the information thus obtained, optimum goals are derived, and actual selling and production efforts can be coordinated towards the attainment of these goals. Some examples are presented below:

1. The sales manager noted that he had been emphasizing some styles which were actually poor profit builders. He was able to redirect promotion efforts, thus en-

hancing over-all profits.

2. The superintendent of the mill shown in *Table 1* gave further attention to the entries in Lines 6a-d, noting the bottlenecks in carding and weaving. He subsequently found means of increasing the production rates on the cards and on the looms, without affecting quality, so that these processes were now absorbing unused "slack" capacity in roving and spinning. Thus, over-all production was increased.

3. When examining the L P solution, one mill found that it excluded from the optimal program certain styles which needed to be supplied in relatively small quantities to some customers for the sake of a "complete line." Further L P examinations showed that it would be less expensive to buy these styles from other mills and to streamline production at the company mill of the more profitable styles.

4. Another mill, producing inventory prior to peak season times, was able to use L P to coordinate its sales forecasting, inventory, and production planning, resulting in improved over-all operation.

LP Analyses—How Often? L P is not a planning technique useful only at the start of each selling season. Instead, it should become an integral part of of coordinated sales and production planning of the organization. An L P program at the beginning of the season helps to establish over-all goals. Then, as the season progresses and sales are made, the effects are noted, and weekly L P programs are laid out for the unsold and uncommitted balance of mill capacity.

Such factors as inventories, price changes, anticipated trends, and other developments, are incorporated in each weekly program. The mill thus keeps its planning on a continuing and dynamic basis.

Background of L P. While the problem of Linear Programming is universal in industry, it was not generally recognized as such for many years. Where it was recognized, it was quickly dismissed for want of a precise mathematical way of handling it. The credit for developing a useful approach must go to Danzig (3)*. Subsequently, this writer made what he believes to be the first textile application of L P, in a woolen-worsted mill, presented in a consulting report.

The first published textile application of LP appeared in Japan (4). Subsequently, an American application was published (2). Simple mathematical procedures of Linear Programming are described in a popular text by Charnes (1) and his co-workers.

*Figures in parentheses are references at the end of the article.

Acknowledgment

The mill data on which this paper is based were previously presented (from a mathematical and not the present mill management viewpoint) before the Statistics Section of the Virginia Academy of Science, based on the release of these data by Dr. L. H. Hance, president, and Dr. Jack Compton, vice-president and director of research, Institute of Textile Technology, Charlottesville, Va. Appreciation is expressed for their guidance and encouragement in operations research project work while the author was on the Institute staff. Computer programming of the data discussed was done by Sue C. Lawrence, now consultant in operations research, Williamsburg, Va.

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Here's an idea for carpet mill lab technicians

■ A HOUSTON, Texas, store-owner took a page out of the Arabian Nights recently to demonstrate the abrasive-resistance qualities of Chemstrand's "Cumuloft" nylon carpeting.

Edward J. Knebel, owner of the Village Carpetland in Houston, simply gave a unique twist to the old idea of the magic carpet: he wrapped strips of Wunda Weve Carpet Company's "Random" and "Lyric" carpeting around the wheels of a 1931 Model "A" Ford and drove the car 238 miles, from Houston to Corpus Christi. If anything could prove that Chemstrand's Cumuloft nylon could withstand tremendous amounts of abrasive wear, this should, Mr. Knebel reasoned.

When Mr. Knebel was through with them, the strips of carpeting showed that a full 90 per cent of the original yarn was retained and that the only noticeable change was that the carpeting had become dirty where it had touched the pavement.

To capitalize on his demonstration, the retailer displayed the results prominently at the ten-day 1961 Home Furnishings Exposition in Houston. "Here are the results! After 238 miles of rolling at 40 mph, Houston to Corpus Christi, on Wunda Weve Random," read the sign over the display piece of the carpet. One portion of the carpet was cleaned to show that it could be completely "brought back to life" after such a grueling test. Other portions of the carpeting were available in the store for customers to handle.

Mr. Knebel took ads in the Houston newspapers to post readers on his progress during the trip.

This merchant has used other tests to show the qualities of carpets. He has placed the carpets on parking lots and on heavily traveled sidewalks where they were exposed to traffic and to sun, rain, hail, and the rest of the elements. The carpets were then cleaned and installed in Houston homes and used to demonstrate wearability.

Inspecting one of the nylon-carpet-covered tires after the 238-mile trip from Houston to Corpus Christi is Corpus Christi's Mayor King (left) and Mr. Knebel. It was found that the carpeting maintained 100 per cent of its resiliency and showed almost no wear.

After nearly four years of testing, Crystal Springs Bleachery gives the Draper shuttleless loom an unqualified okay

No shuttles... ...no regrets

Staff prepared—Exclusive

Nolan Patterson shows how easy doffing is. Unlock two brackets and roll cloth onto dolly.

IN 1956, Draper Corp. asked Crystal Spring Bleachery, Chickamauga, Ga., to conduct mill test with the Draper shuttleless loom. With the firm's approval, Draper moved to get the looms installed, so by early 1957 they began to arrive—wrapped in cellophane.

The installation crew arranged them in the present building—a concrete-and-steel structure of the type that does not depend on its walls for any support—and Henry Jewell, who headed up the testing program, settled to the serious business of getting production out of wholly new equipment and techniques.

In the meantime, C. S. had sent its maintenance force and one shift foreman to Draper's Hopedale, Mass., shops to be schooled in maintaining the new units. Superintendent Frank (Rip) Henderson lined up a crew to operate the new department in *strictest secrecy*.

"Rip" knew his personnel. He began the delicate job by mentally checking off the temperamentally unsuited, recalling each little quirk of personality that would loom as a strength or as a weakness in the "war of secrecy" that was to follow. Knowing the fondness some of his personnel had for exercising their freedom of speech, the lack of firmness some would display as friends forever pried about what was taking place "in that new department," and the capacity some had for maintaining an even keel and a straight course, come what may, he chose so wisely that the appointments aroused no resentments—they seemed the natural choice of all. "Rip" took the select ones into his confidence, explained the absolute need of secrecy.

Those selected represented not only the temperament Rip knew to be necessary, but each was a qualified employee in weaving or maintenance as well. And heading the list was Herman Chambers, shift foreman, who was to be the "rock" among the personnel—the man who carried all the answers either in his memory, locked in his training manuals, or in the name of a Draper representative who could be reached when the unforeseen arose. Herman is still the "rock," as management consults him on all major decisions related to DSL operation.

As the personnel became accustomed to their new duties, they became increasingly sold on the new loom's performance. Today, none wishes a return to the "good old days." For not only has the new department earned a measure of prestige, but to the present staff the work is more satisfactory.

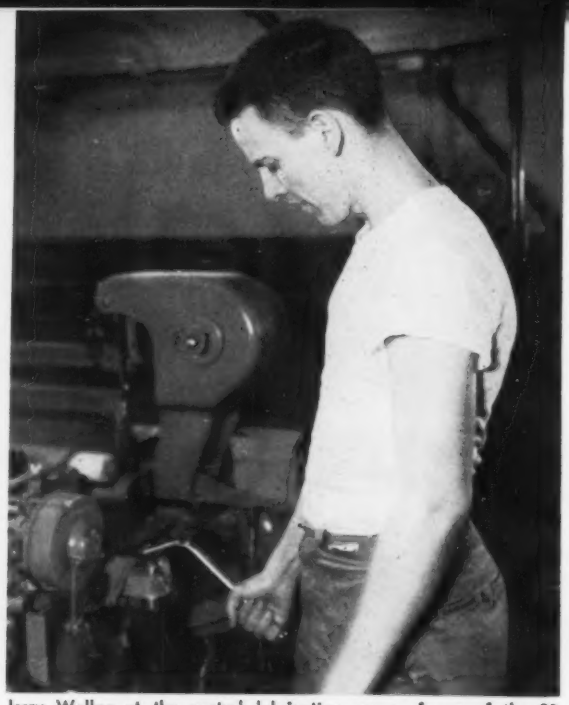
He succeeded so well that the department operated 1½ years before it became generally known that the "new room" contained the DSL. Simple use of lock and key, and personnel integrity, turned the trick.

The rapier-type looms utilize two steel tapes, onto which are affixed the right- and left-hand filling carriers (see TI for January 1959, p. 54 for more details), to insert the filling. There is no crank shaft, and harness cam treadles pivot at the front of the loom.

Cams, ground with almost 50-per-cent dwell to allow sufficient insertion time, move the lay back and forth with a separate set of cams supplying the motion each

Maintenance man sets handwheel (right) to correct degree mark, then times the appropriate loom motion.

Maintenance Engineer Dalton Haney, Shift Foreman Herman Chambers, trained by Draper, say "It's like starting all over again."



Jerry Walker at the central lubrication pump of one of the 90 looms. A single stroke of the pump handle oils the entire loom.

way. These cams operate against ball-bearing rollers in the aluminum swords, and all are hardened and machined.

A central lubrication system oils all points of wear when the cylinder plunger is lifted and closed. There are no plain bearings.

Crystal Springs operates the 90 looms with two weavers, one maintenance engineer, and a utility employee who does the cleaning, creels the filling yarns, operates the manual lubrication systems, and does other odd jobs. Smashing and tying-in are performed by help from the conventional weave rooms.

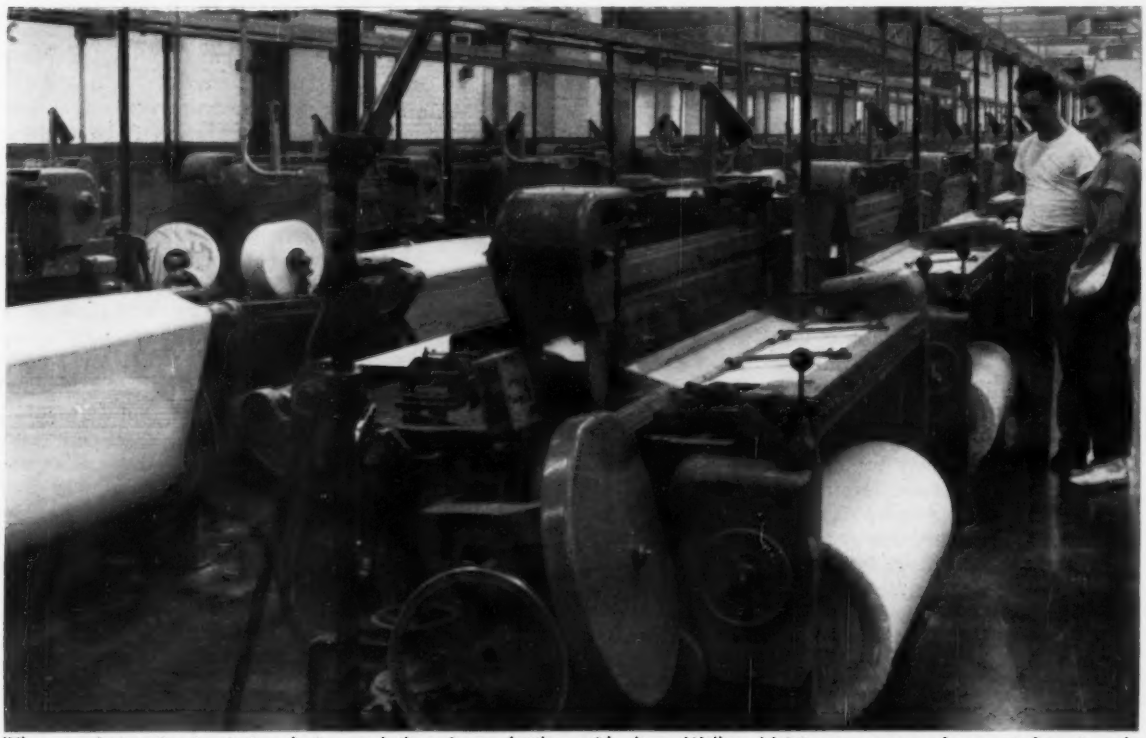
To the conventional loom fixer there is little of the familiar in the way a fixer on the shuttleless models goes about "fixing." As the personnel who studied the looms at Hopedale say, "The sooner a fixer forgets what he knows about conventional looms, the sooner he can start learning these."

To begin with, the "shuttleless" maintenance force carries only one gauge, a tiny thing kept on his key ring and used for setting the filling control motion. A handwheel calibrated in angular degrees, and a pointer, serve as timing aids. And the engineer refers

Evelyn Swafford likes "the clean design" of the new loom. Here she easily reaches drop wire bank to tie in a broken warp end.

"They make good cloth and make it fast," says "Rip" Henderson, superintendent, "and their speed requires strong, clean warps."

"Our personnel mastered the looms and gained prestige in doing it," says Rance Ragsdale, weaving superintendent. "They don't wish to go back to the old departments." With him is Ruby Frye who likes "the open front, absence of handrail, and the lack of arch."



"They are just easier to start and stop, and there is no shuttle to fly out or to be boxed just so," says Jacqueline Hopkins, shown with Jerry Walker. Maintenance personnel respect looms' workmanship and simplicity; weavers the clean lines, handling ease.

to Draper's complete handbook on the shuttless loom whenever he wishes to check a setting.

Each recognizes a monumental drop in room noise. Additionally: Evelyn Swafford, weaver, likes the clean design of the new loom, its responsiveness to the shipper handle, its "lightness." Ruby Frye, weaver, remarks that the loom front is open enough to allow easy access to filling, reed, and harnesses and is much easier to "get around." Jacqueline Hopkins, second shift weaver, is pleased with the lack of complications in the picking motion—there are no shuttles to be boxed in matching a pick, repairing a filling break, etc.

As for the maintenance personnel and supervisors, they hold a great respect for the preciseness, simplicity, and the convenience of the new unit. "Maintaining these is just more pleasant," they say.

Management still studies the loom's performance, responds to Draper's wishes in running with a new setting or timing, installs and studies each new part Draper introduces, and in short still looks on the new department as an interesting, sound, and promising guinea pig. So the 46" looms sit there and quietly stab away at making sheetings and light drills. They are so vibration-free that a glass of water set on the breast beam doesn't "walk" about.

The few changes Draper has introduced over the past four years consist largely of minor improvements. The basics are unchanged.

An aluminum lay replaces the original wooden one; the tape material and design are an improvement over the original; cams are simpler; and the thread cutter and center fork now last longer, give better performances. The "stopped" signal light was moved to the top of the loom.

The fringe selvage offers no problem (see TI for September 1960, p. 147, for a report on this) in finishing, and the cutters don't complain about it. Picks per minute? An easy 238 around the clock.

"We're happy with them," says Vice-President R. Houston Jewell.

Executive views *(from page 33)*

was in progress, employees of the Rutland Railroad decided to strike to keep the railroad from abandoning some unprofitable freight trains. The Rutland is a small railroad and has its share of six-, eight-, and ten-car freight trains. It takes just as big a crew to handle a six-car train as one with 200 cars, and it is ridiculous for a railroad to be forced to run unnecessary trains when the traffic does not justify it. The union, however, takes the position that the first duty of the railroad is to avoid laying off any union men. What trains shall be run would seem to be solely a decision of management, and when management can not make a decision of this sort, free enterprise is dying.

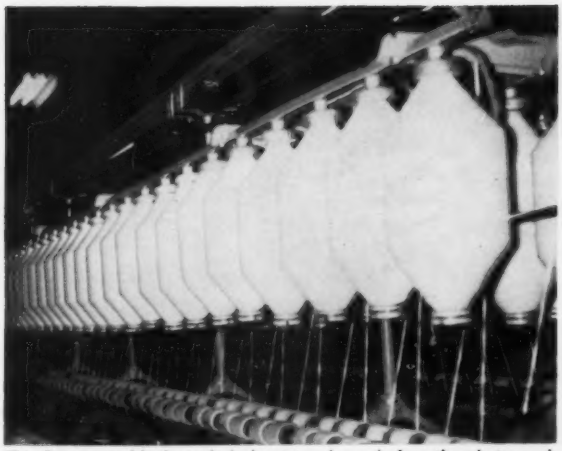
There are 20 states which now have Right-to-Work Laws, and every state should have them, and so should the federal government. The labor racketeers of course justify the virtual peonage they inflict upon their members by claiming that if they are going to rob employers through their activities, all the beneficiaries of the robbery should pay tribute to the organization which made the banditry possible. This seems a specious argument, because certainly an employer should have some protection against pure banditry.

ONE OF THE WORST features of our federal labor laws is the provision for forced unionism. Nobody should be required to join anything for any reason if he doesn't want to, but the labor racketeers will never be satisfied until they can force everybody to join and pay tribute to their rackets. At the present time, even with the laws favoring the rackets, they have been unable to get as many as 25 per cent of the working people of the United States to join, and in some sections there are fewer union people today than there were ten years ago.

We urgently need a national Right-to-Work Law which would leave it up to the discretion of the individual whether he wanted to join a union or whether he didn't; and if any coercion is brought to bear upon people to force them into unions, the people doing the coercing should be severely punished. Coercion is the exact antithesis of freedom, and where people can be forced to join an organization which is repugnant to them and pay tribute to racketeers that they detest, they have lost their freedom.

More and more labor union activities are aimed in the direction of having an active hand in management. It is hard for management to combat these activities under our present laws which permit a mere handful of people to completely dominate the lives of hundreds of thousands of workers. This is the same kind of tyranny that is exercised in Russia and other communist countries where freedom of action is denied the individual worker. Our labor unions can exert just about the same control over their members that the Communist Party exerts over workers in Russia. In a large American city, a man can not work at any trade without either belonging to a union or risking his life in refusing to belong. Even common laborers must pay tribute to some racket.

Free enterprise has served this country and its people well, and we do not believe that it is a temporary expedient which has now served its purpose and should be abandoned. The socialists and communists argue that free enterprise may have been all right during the development stage of America, but that it is now outmoded and should be replaced by collectivism. We believe that nothing could be further from the best interests of the American people. We have been strong because we have been self-reliant, and we will lose our strength as we teach our people to become completely dependent upon the government or upon some labor union.

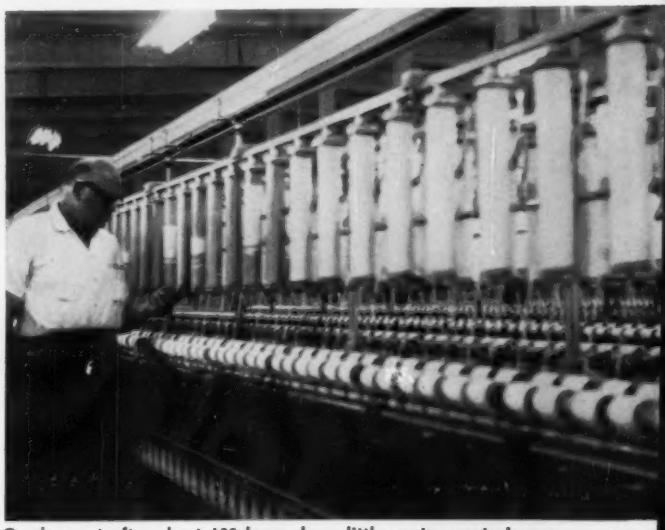


This frame was block-creeled about two hours before the photograph above was made. Note the uniformity of the roving on the bobbins.

Spinning frame cleaning operations in last stages. The creels are filled during the cleaning procedure, will run 110 to 160 hours.

They cut spinning costs $18,000 a year

Block creeling and a new cleaning program did the trick for this mill



Creel runout after about 100 hours shows little waste—waste is now about the same with block creeling as it was with random creeling.

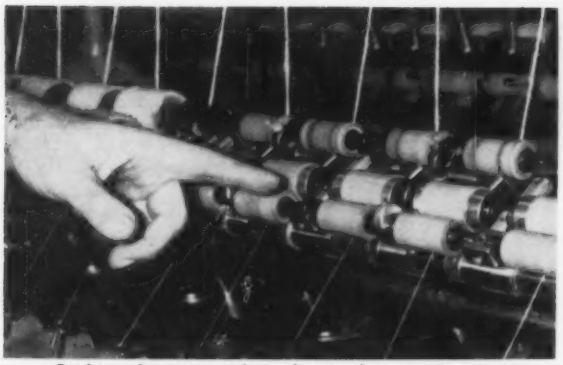
Staff prepared Exclusive

BLOCK CREELING in spinning has shown these advantages at the Eno Plant of Cone Mills Corp.: (1) Eliminates heavy places in yarn, usually caused by tailings in creeling-in; (2) Reduction in ends down per thousand spindle hours by 8-10 per cent; (3) Makes for a more efficient and effective cleaning procedure. And spinners like the block creeling arrangement and say the job runs better.

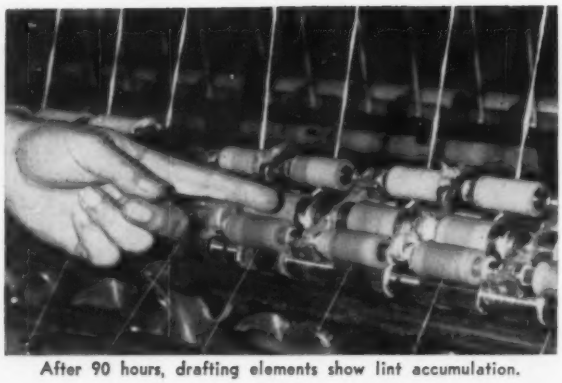
Operating in conjunction with the block creeling program, a cleaning program has enabled the mill to save at least $18,000 a year. The changeover system of cleaning has been in effect about two years and calls for cleaning about 18 frames per shift. This cleaning includes blowing off the umbrella creel and bobbin holders while the creel is empty and the frame is standing idle. At this time idlers, cylinders, and lower motion and gear heads are blown off. Then top and bottom rolls and aprons are blown while the frame runs with no stock. Roving traverse motion, spindles, rails, and draft gears are blown while the frame is running with no stock.

Commercial alcohol on flannel cloth serves as the cleaner for pneumatic end collectors, tubes, roll stands, and beams. Travelers are changed, lifter rods are oiled, and top and bottom rolls are oiled. Rolls are oiled every 50-60 hours. Cleaning operations are performed at 100-120 hour intervals, one frame at a time and on a cycle basis. Although the same amount of labor is now used in cleaning as formerly, more effective cleaning is accomplished.

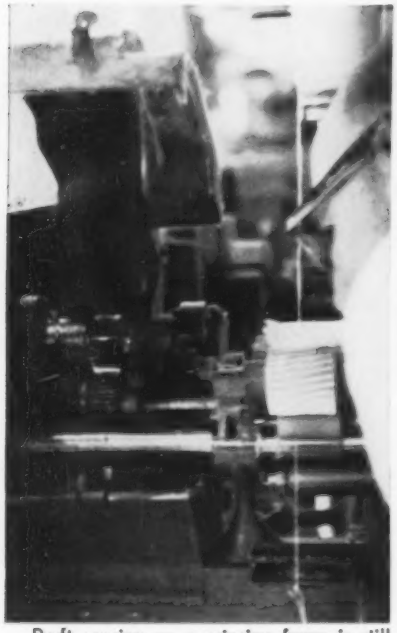
Block creeling has been in use for the past six months, with significant improvements in production and quality as well as permitting more effective cleaning. While the creel is empty, the cleaning operations are done, the



Drafting elements are clean after two hours running time.



After 90 hours, drafting elements show lint accumulation.



Draft gearing on a spinning frame is still clean after about 75 hours running time.

Frame and ceiling cleaners run continuously; floors are swept by push mops at about two-hour intervals. Sweeper gathers pneumatic end collector waste and takes it to waste house.

creel is refilled, and the frame is started clean for another 100-120 hours of operation.

The bobbins are 12 x 7, and carry 72-75 ounces of roving from FS2 frames; these run 110-160 hours, depending on yarn count.

Spinning frames are equipped with Shaw SS2 drafting and all stock is carded 1 1/16" SLM cotton on counts from 13s to 28s.

Thick and thin places observed in the yarn were traced to roll pickers before the changeover to block creeling and the new cleaning program. Any movement of rolls in the drafting system changed the draft momentarily and made irregularities in the yarn.

Corduroy fabrics are made from the yarns, and this predominantly filling-flush fabric must have strong, uniform yarns to withstand abrasion in the heddles and reed during weaving in view of its slow movement through the loom.

A 2 per cent over-all improvement in weaving efficiency was attributed directly to the change in cleaning methods, along with a 10 per cent reduction in warp end breakage in weaving, according to M. E. Allison, plant official.

In block creeling, bobbins are run as close to empty as practical —down to about 1-1½ layers of roving. Although roving frames are not equipped with knockoff counters, waste appears to be about the same on block creeling as it was on random creeling.

Before block creeling was adopted, there were creeler tenders as well as cleaning crew. Now with block creeling, the cleaning crew does the creeling upon completing the cleaning chore. By combining the operations, a saving is effected in labor requirements, and quality improved considerably.

Before the change in cleaning

procedure, roll pickers were employed, and five women on each shift cared for 30,000 spindles. Both ceiling and downdraft overhead cleaning equipment was in use when roll picking was done, and two men worked 40 hours per week blowing off rails and rockers and thread guides with compressed air. Roll picking equipment is now used on Abbott quillers and on slubbers.

Spinning speeds are adapted to work loads, and all doffs are scheduled for eight hours. Spinning frames are 3¾ gauge, have 2½-inch rings, and put about 6 ounces on each bobbin. Front roll speeds range from 115-150 rpm, depending on yarn counts and ring size. Some frames have 2-inch rings; some, 2¼-inch rings. Spindle speeds vary from 8-10,000 rpm. Relative humidity is maintained at 40 per cent in the spinning room.

The employee-management relationship engenders good spirit and cooperation in this plant and makes the saving possible on improved functions, whatever they may be. Joe Hughes is manager, and T. E. Rice is assistant manager of the Eno plant, which is located at Hillsboro, N. C.

Do you have adequate lighting at processing machines?

■ USE the accompanying lighting recommendations of the Illuminating Engineering Society as a guide in checking conditions in your mill. According to the Large Lamp Department of General Electric Co., compliance with these suggestions can reduce manufacturing costs as quick, easy seeing is provided for operatives.

Currently Recommended Levels of Illumination for Textile Mills
(Minimum on the task at all times)

	Foot-candles
Cotton Mills	
Opening, mixing, picking	30
Carding and drawing	50
Slubbing, roving, spinning and spooling	50
Beaming and slashing on comb	
Grey goods	50
Denims	150
Inspection	
Grey goods (hand turning)	100
Denims (rapidly moving)	500*
Automatic tying-in	150*
Drawing-in by hand	200*
Weaving	100
Silk and Synthetic Mills	
Manufacturing	
Soaking, fugitive tinting, and conditioning or setting of twist	30
Winding, twisting, rewinding, and coning, quilling, slashing	
Light thread	50
Dark thread	200
Warping (silk or cotton system) on creel, on running ends, on reel, on beam, on warp at beaming	100
Drawing-in	
On heddles	200*
On reed	200*
Weaving	100
Woolen and Worsted Mills	
Opening, blending, picking	30
Grading	100*
Carding, combing, recombing, gilling	50
Drawing (white)	50
Drawing (colored)	100
Spinning (frame) (white)	50
Spinning (frame) (colored)	100
Spinning (mule) (white)	50
Spinning (mule) (colored)	100
Twisting (white)	50
Winding (white)	30
Winding (colored)	50
Warping (white)	50
Warping (white) (at reed)	100
Warping (colored)	100
Warping (colored) (at reed)	300*
Weaving (white)	100
Weaving (colored)	200
Grey Goods Room	
Burling	150*
Sewing	300*
Folding	70
Wet Finishing	
Fulling	50
Scouring	50
Crabbing	50
Drying	50
Dyeing	100*
Dry Finishing	
Napping	70
Shearing	100*
Conditioning	70
Pressing	70
Inspecting (perching)	2000*
Folding	70

*Often obtained with a combination of general lighting plus specialized supplementary lighting. Care should be taken to keep within the recommended brightness ratios. These seeing tasks generally involve the discrimination of fine detail for long periods of time and under conditions of poor contrast. To provide the required illumination, a combination of the general lighting indicated plus specialized supplementary lighting is necessary. The design and installation of the combination system must not only provide a sufficient amount of light, but also the proper direction of light, diffusion, and eye protection. As far as possible it should eliminate direct and reflected glare as well as objectionable shadows.

WARP TENSION

... a prime factor in weaving and finishing of woolens and worsteds

by Louis Szponder
Spinners Ltd., Huntingdon, Quebec
Exclusive

WARP TENSION during weaving is only one example of the possible strains and stretches imposed upon the yarn before it is converted into fabric.

The tension of warp yarns in the preparatory processes prior to weaving plays an important part.

Generally, the greater the stretches the less significant are the differences between various warp tensioning in loom. However in this study, it is regretted, no data are available concerning this.

In woolen and worsted weaving the cloth in the loom is held in position by the temples and the rough surface of the take-up roller. As long as the cloth is in the temple grips, no contraction seems to be possible. However, immediately the fabric is off the temples, the strained filling begins to bend around the tight warp ends, resulting in reduced cloth width.

The degree to which this takes place depends upon:

1. Cloth construction
2. Filling tension in shuttle
3. Warp tension in loom
4. Type and position of take-up roller.

Warp tension prevents the ends from bending over and under the filling. After the cloth passes the take-up roller this warp tension is no longer present and warpwise contraction begins, its degree depending upon:

1. Cloth structure
2. Warp tension
3. The degree of stretch of warp yarn prior to weaving.

Warp tension only is discussed in this work.

Procedures Used. Pieces were woven from two similar 15-cut warps, with warp tension adjusted as required with the use of our slasher tensiometer over the same 332 ends at the edge of the warp. The tensiometer is a comparator device, and although it is not designed for checking warp tension during weaving, it served the purpose satisfactorily.

Each 75 yards of dressed length were woven with the same tension throughout. In some cases it was necessary to adjust the tension between beginning and end of the cut. All measurements were taken under normal production conditions and are accurate to ± 0.25 per cent. The pieces were dyed and finished simultaneously.

Samples of finished fabrics were tested for:

1. Shrinkage in water and on the Hoffman press
2. Ends and picks per inch, and angle of twill
3. Weights per square and running yard.

All tests except Hoffman press were performed in the same atmospheric conditions. See the box below for sample data.

The pieces were woven on Model W-3 Crompton & Knowles automatic looms at 128 ppm in a weaving shed conditioned to 50% to 55% rh with temperatures ranging from 72 F to 75 F. The warp tensions,

Fabric (Sample) Specifications

Type of fabric	all-wool gabardine
Weave	2/2 twill
Set	90/50 ends and picks per inch
Count, warp	2/40 worsted 14 t.p.i. "S"
Count, filling	2/36 worsted 13 t.p.i. "S"
Warp length	75 yd
Width in loom	64.5 inches
Grey length	67 yd
Finished length	63 yd
Finished width	58 inches
Grey weight of warp	38.8 lb
Grey weight of filling	21.6 lb
Grey oz/yd (running)	14.4
Finished oz/yd	14.1

types of let-off motion used, and the position of the take-up roller are given in *Table 1*.

The tension on the automatic let-off motion was steady throughout the weaving of the same cut, while that on the negative let-off motion was changeable (higher as the warp diminished in size). It was also found that on the negative let-off motion, going below the medium tension gave trouble in weaving.

The reasons for the differences were purely mechanical and are not discussed. It was observed that the end breakages were several times higher for the low tension compared with the high tension.

The pieces were measured immediately after they were taken from the looms. The results of those measurements are give in *Table 2*.

The high warp tension pieces are heavier, although there is no difference in ounces per running yard. The reason for the width differences will be explained later.

Table 3 shows the filling consumed and the relative time of weaving. Only fabrics 1 - 3 will be considered.

The differences between "yards woven" are higher than the differences between "grey length." The latter shows a difference of only 1.5 yards compared with the 4.3 yards for the former between fabric Nos. 1 and 3. A double check was made on fabric No. 1; an exact measure of 36" was marked in the loom and then remeasured in grey, showing a contraction down to 33⅝" or 6.6 per cent, while:

$$\frac{\text{yards woven (73.3)} - \text{grey length (68.5)} \times 100}{\text{yards woven (73.3)}} = 6.6\%$$

The fabrics were allowed to relax in the grey for 48 hours. They were then remeasured on the grey perch and also by running a measuring tape on the make-up machine. The results are in *Table 4*.

The relaxation in the grey shows only warp contraction. It seems that the crimping or bending of the filling is fully accomplished in the loom and that there is no further contraction widthwise after the cloth has been released from mechanical tension. The theory behind this is illustrated in Figs. 1, 2, and 3.

The amount of filling bending depends on the relative warp and filling tension at the time the shed closes. Once the pick is inserted, any further bending of it depends on the horizontal cloth tension. The tension is greatly reduced when the cloth leaves the temples, and in theory as in practice it is possible to have the warp ends in the same plane while the filling bends around them—Fig. 2.

When warp tension is lost (cloth off take-up roller), the crimped filling strands begin to straighten, while, simultaneously, the straight warp ends (held hitherto under strain) start to bend until both groups of threads are balanced in position. It is also of importance to observe the effect on contraction in length. In practice a piece may be measured immediately after felling or 3 days later; hence, it is obvious that the grey perch yardage is not a very reliable figure.

Whether the relaxation in grey has any effect on shrinkage in finishing is not known. However, it is

TABLE 1
Warp Tension and Take-Up Roller Positions Used

Fab. No.	Tension: Descriptive range	Tension: Numerical value (inst.)	Type of let-off motions	Take-Up Roller: From fell of cloth	Take-Up Roller: Type of roll cover
1	high	100	auto. pos.	far	Durite cloth
2	med.	80	"	far	"
3	low	65	"	far	"
4	high	101	neg.	near	sand-paper
5	med.	80	"	near	"

TABLE 2
Cloth Widths, Constructions, and Weights

Fab. No.	Length (yd) L	Length (yd) Grey	Width (") L	Width (") Grey	Sley & ppi L	Sley & ppi Grey	Lb per cut	Oz per linear yd
1	75	68.5	64.5	61.75	90/50	94/53.5	61.25	14.30
2	75	67.75	64.5	62.5	90/50	93/52.5	60.5	14.29
3	75	67.0	64.5	63.0	95/50	92/51.5	60.0	14.33
4	75	68.5	64.5	62.25	90/51	92.8/53.5	61.25	14.31
5	75	68.0	64.5	63.0	90/51	92/52.5	61.0	14.35

L=loom

TABLE 3
Filling Consumed and Weaving Time
(128 ppm, 85% efficiency)

Fab. No.	Picks	Yards	Take-up on 75 yd (%)	Filling used (lb)	Weaving time Hr	Weaving time Min
1	1319	73.3	2.28	23.4	20	12
2	1280	71.2	5.06	22.7	19	36
3	1242	69.0	8.00	22.0	19	08

TABLE 4
Constructions in Relaxed Grey Length
Amount of Contraction

Fab. No.	Grey length (yd)	Relaxed length (yd)	Contraction (%)	Width (")	Picks per inch
1	68.5	65.875	3.8	61.75	55.0
2	67.75	65.5	3.3	62.5	53.5
3	67.0	64.875	3.2	63.0	52.5
4	68.5	65.625	4.2	62.25	55.0
5	68.0	65.5	3.7	63.0	53.5

TABLE 5

Shrinkage in Finishing

Process		Per cent shrinkage by fabric numbers				
		No. 1	No. 2	No. 3	No. 4	No. 5
Crabbing	(w)	3.0	2.0	3.5	5.0	3.5
	(f)	2.8	3.6	3.2	2.0	1.2
Scouring	(w)	9.5	8.5	9.0	8.5	8.5
	(f)	4.4	4.0	6.0	4.8	5.1
Dyeing	(w)	9.5	8.5	9.0	9.0	8.5
	(f)	4.8	5.2	6.7	4.8	5.5
Drying	(w)	11.5	11.2	12.5	12.0	11.5
	(f)	3.6	4.8	5.5	4.0	5.5
Decating	(w)	7.5	7.0	9.0	9.0	8.0
	(f)	3.2	4.0	6.4	4.0	6.0

TABLE 6

Finished Lengths, Widths, and Weights

Fab. No.	L'th (yd)	Width (")	Grey weight Full piece (lb)	Grey weight Oz per yd	Finished weight Full piece (lb)	Finished weight Oz per yd	Wt loss (%)
1	59.88	58.0	60.0	13.9	56.75	15.2	5.4
2	61.5	58.5	59.62	14.0	58.0	15.1	2.7
3	60.62	58.5	59.25	14.0	57.0	15.0	3.8
4	60.0	58.5	60.5	14.1	56.75	15.1	6.6
5	61.0	59.0	60.25	14.2	57.5	15.1	5.0

considered that all pieces will have a chance to relax before the wet processes and therefore the question is more of academic than of practical importance.

The per cent shrinkage data during the various wet and dry operations are given in *Table 6*. This test was performed by marking one yard warpwise prior to finishing and then remeasuring after each operation. Similarly, full-width measurements were taken. It is a comparative test and it has to be analyzed as such.

There is no important difference in length contraction between the five fabrics. However, filling shrinkage is quite significant for fabric Nos. 3 & 5 compared with the remainder. It will be noted that these were the widest cloths in the grey.

Comparing drying and decating data, one gets the impression that stretching takes place in decating. In fact, these differences are due to different moisture content.

In *Table 6* the finished piece measurements of length, width and oz/yd are given. Also total piece weights in grey and finished and per cent loss in finishing are shown.

The total grey weights follow a pattern (i.e., the higher the warp tension the heavier the fabric). However, this is not so for the finished weights, and as the figures were taken under a normally varying relative humidity in the finishing plant, the weights for fabric Nos. 2 & 3 are considered to be too high. This has been proved by laboratory test (see *Table 11*).

Table 7 gives the total warp contraction from dressed, grey and relaxed length in finished length.

In practice per cent shrinkage in finishing is calculated on grey and finished length. This is hardly correct and in some cases might affect cloth setting and costing if these data are used without discrimination.

The pattern which was observed in *Table 4* (namely, the difference between fabrics Nos. 1 & 2 or 4 & 5 in per cent warp contraction during the relaxation of grey pieces) is still retained.

The total contraction from dressed length to finished length differs by about two per cent or 1.5 yd of finished cloth.

Total filling shrinkage is higher for fabrics Nos. 1 & 4. However, the grey-finished per cent filling shrinkage shows the reverse. This is due to the fabrics with lesser warp tension being taken off the loom in a wider state than fabrics with a high warp tension.

Per cent area shrinkage indicates higher contraction throughout for fabrics Nos. 1 & 4. This will lead to the assumption that the higher the warp tension the more compact the cloth, while the more compact the cloth the better the cloth stability. The latter statement is perfectly correct as far as cloth setting is concerned, but it is not true where the extra cloth compactness is obtained by means of mechanical tension.

The following part of this work shows that on wetting and drying the heavier fabrics shrink as much or more than the lighter ones.

The high weft shrinkage for fabrics Nos. 1 & 4 was not expected. This would indicate that the stretched warp was not fully relaxed in finishing. Considering that certain lengthwise tension is main-

FIGURE 1. Cloth in temples, warp and filling under tension; pressure both ways allows warp and filling to interlace, contract.

FIGURE 2. Cloth between temples and take-up roller, only warp tension present. Thus warp ends are free to approximate a plane.

FIGURE 3. Cloth off the loom, warp and filling relaxed, no pressure present. Now warp and filling are in a balanced condition.

TABLE 7
Warp Take-Up and Shrinkage During Manufacture

Fab. No.	Dressed to fin. length		Grey to fin. length		Relaxed to fin. length	
	Yards	Take-up (%)	Yards	Take-up (%)	Yards	Rel. shrinkage (%)
1	15.12	20.0	9.12	13.2	6	9.1
2	13.5	18.0	6.75	9.5	4	6.2
3	14.5	19.1	7.0	10.1	4.25	6.5
4	15.0	20.0	8.5	12.3	5.62	8.6
5	14.0	18.7	7.25	10.3	4.5	6.9

TABLE 8
Contraction Fillingwise and Area Shrinkage in Finishing

Fab. No.	Filling contraction (%)		Area shrinkage (%)		
	Loom to fin.	Grey to fin.	Loom to fin.	Grey to fin.	Relaxed to fin.
1	10.0	6	28.2	18.5	14.6
2	9.3	6.4	25.6	15.3	12.1
3	9.3	7.0	26.7	16.6	13.2
4	9.3	6	27.4	17.6	13.3
5	8.5	6.4	25.6	16.0	12.8

tained throughout the processes this seems to be a logical explanation. However, more tests and investigation is required to arrive at a conclusion.

Samples were subjected to the repeated action of steam on the flat bed Hoffman press in the following manner:

1. Steamed for 15 seconds, head unlocked
2. Steamed for 15 seconds, head locked
3. Cooled for 30 seconds.

Three successive pressings were given on each sample, and the samples were then given cold-water sponging test. The results are given in *Table 10*. Only fabric Nos. 1 & 3 were tested.

The finished ends and picks per inch, elongation of warp and weft, and the angle of twill are shown in *Table 11*.

The angle of twill was calculated according to the relationship of ends and picks, using the following formula:

$$\text{Tan. } X = \frac{\frac{1}{\text{picks}}}{\frac{1}{\text{ends}}} = \frac{\text{ends}}{\text{picks}}$$

Fabric Nos. 2 & 3 gives the steeper twill which is a desirable feature in a gabardine cloth.

The difference of 4 picks/inch (or 7 per cent) for fabric No. 1 compared with No. 2 is considered quite significant.

TABLE 9
Sponging Test Results

Fabric number	Shrinkage (%)		
	Warp	Filling	Area
1	5.0	3.8	8.6
2	5.6	1.2	6.7
3	5.0	0.8	5.8
4	5.0	2.7	7.6
5	5.0	1.8	6.7

NOTE: This test was done according to A.S.T.M. standards. The samples were tested over 10" warp and filling, and three tests were taken on each fabric.

TABLE 10
Hoffman Press and Sponging Shrinkage
(shrinkages in %)

Fabric number	Hoffman press			Hoffman press followed by cold water sponging		
	warp	filling	area	warp	filling	area
1	3.8	1.2	5.0	5.6	2.0	7.6
2	3.8	1.2	5.0	5.0	1.2	6.2
3	3.8	1.2	5.0	5.0	1.2	6.2

TABLE 11
Finished Construction, Crimp, and Angle of Twill

Fab. No.	Sley & ppi	Crimp (%)		Twill Angle		
		F	W	In loom	In grey	In finished goods
1	99/60	9.8	24.0	61°	59°-53′	58°-45′
2	98/56	8.7	22.9	61°	60°-42′	60°-45′
3	98/56	9.0	23.3	61°	60°-48′	60°-45′

Conclusions. By using a suitable warp tension in worsted weaving it is possible to:

1. Increase weaving production
2. Improve the finished cloth quality

The warp tension will vary according to: a. design; b. raw material; c. type and size of yarn; and d. treatments of the yarn in previous operations. It should also vary according to finished cloth handle requirements.

High tension in weaving will give a boardy stiff cloth, a quality that may be desirable in a gabardine cloth but is highly objectionable in ladies' worsted dress cloth.

It is also important to bear in mind the time lost in weaving when using a wrong warp tension. Weaving slack can increase end breakage. Weaving tight can result in up to a three-per-cent loss in production (this loss will not change the loom efficiency). A standardized warp tension for different styles and looms could help to make better products at a lower cost.

Troubleshooting the

Effect of fiber and yarn structure on the durability of cotton/nylon blended sateens

by Clarence J. Pope and Louis I. Weiner*
Exclusive

THE INTRODUCTION and widespread use of fabrics made of blends of synthetic and natural fibers has added a complicating element to the interpretation of wear patterns observed in laboratory abrasion tests and in field wear. Before a cause can be assigned to premature failure, it is important to know which fiber type in a blend fails initially or predominantly; it is therefore obvious that an experimental technique for determining such failure is required.

Studies (1, 2, 3, 4, 5)[1] made on single-fiber fabrics indicate that abrasion produces a weakening of fibers which is reflected in the development of cracks in the fiber surface, fibrillation, bruising, disappearance of scales (in the case of wool), and actual breaking of the fibers. These morphological changes are responsible for loss of strength of the individual fibers and a decrease in chain length of the fiber molecule which, in the case of cellulosic fibers, is attended by an increase in cuprammonium fluidity. It was observed that the cracking and ultimate breakage of the fibers results in a significant decrease in staple length. Moreover, it has been noted (6) that such modification of fiber properties will influence yarn and/or fabric characteristics.

Other studies (2, 7, 8) have shown that the abrasion resistance of a fabric can be increased by larger diameter yarns because localized pressure is reduced, thereby resulting in less wear damage. In addition, further investigations (2, 10, 11) have indicated that poor binding of low-twist yarns plays an important role in causing early breakdown, while high twist forces yarns to stiffen, which results in high local abrasive pressure and early destruction of the yarns.

In order to determine the effect of abrasion on fiber morphology, a simple technique of measuring changes in staple length was applied to a cotton/nylon blended fabric which had been subjected to accelerated wear on the combat course of the Field Evaluation Agency of the Quartermaster Research and Engineering Command at Fort Lee, Va. In view of the fact that cotton/nylon blends are known to have a high level of abrasion resistance, it was desired to assess the relative contribution of the nylon and the cotton to the ultimate failure of the fabric as observed in such simulated wear.

The garments chosen for examination were selected from among a much larger number that had been subjected to ten cycles of wear on the combat course. Each cycle of wear consisted of two traversals and one laundering. Two sample garments were selected for evaluation; one a cotton/nylon sateen, and the other an all-cotton sateen, both of which had been worn with the filling side (back) of the fabric to the outside.

The all-cotton sateen, the standard fatigue fabric used by the military departments, is conventionally worn with the filling side to the outside. The basis for using the fabric in this fashion has been described previously (11). A detailed statement of the physical and mechanical properties of the

*Textile, Clothing & Footwear Division; Quartermaster Research & Engineering Center; Headquarters, Quartermaster Research & Engineering Command, U. S. Army; Natick, Mass. This paper is Textile Engineering Laboratory Report No. 269.

[1]Figures in parentheses are literature references at the end of the article.

About This Article

An experimental technique was employed to determine which fiber type in cotton/nylon blended yarns failed predominantly under abrasive conditions. An analysis of staple length distributions indicated that the cotton fibers of the blend were significantly damaged during wear, thus reducing the fibers per cross section to a comparatively few nylon fibers to sustain the abrasive action.

Furthermore, an examination of the yarn cross sections suggested that the use of smaller diameter (denier) nylon fibers in the blend would provide more nylon fibers per cross section for a given blend composition and probably enhance the contribution of the nylon to better wear.

In addition, a more intimate mixture of the fibers could be obtained by the use of additional drawing operations or sandwich blending prior to the picking operation.

two sateens studied is given in *Table 1.*

Experimental Procedure. Conventional techniques cannot be used for assessing the length distribution of the fibers in cotton/nylon blended yarns without first separating the nylon from the cotton fibers. A standard method[2] for chemically separating these fibers prescribes the use of a 28% solution of hydrochloric acid (HC1) to dissolve the nylon fibers. However, this concentration tended to weaken the cotton fibers and resulted in an over-all shortening of the staple length distribution. After a series of experiments with various concentrations of HC1 a comparatively milder, 18.5% solution, was found to be satisfactory.

Fibers taken from the yarns were placed in the solution (18.5%) of hydrochloric acid at a temperature of 15 C for 30 minutes. After this time, the fibers

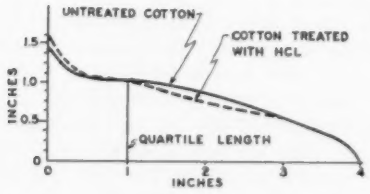


Figure 1. Staple array—control test.

were swished gently through the acid to remove remnants of the nylon and were then rinsed in distilled water until approximately neutral. This procedure dissolved the nylon without significantly affecting the staple length distribution of the cotton.

In order to establish the validity of using 18.5% hydrochloric acid to selectively dissolve the nylon from the cotton/nylon blend, a control test was conducted using samples of cotton staple. The fiber array, prepared by a standard method and illustrated in *Figure 1,* indicates that while the acid treatment changed the shape of the curve to some extent, the observed differences are not significant. In fact, at the high end of the distribution, the acid-treated fibers are somewhat longer than in the untreated sample; at the middle of the distribution, the acid-treated fibers are somewhat shorter than the control; and at the

TABLE 1. Physical and Mechanical Properties of Sateen Fabrics

	Standard Carded Cotton Sateen MIL-C-10296B	Cotton/Nylon* Carded Sateen VEE 673
Fiber Content, %		
Cotton	100	70
Nylon	---	30
Fiber Fineness (Cotton), in., WxF	.0007x.0006	.0006x.0006
Fiber Denier	(Equiv) 1.5	2.2
Fiber Strength (Pressley), psi, WxF	60,500x59,500	51,000**x52,000** 50,000***x49,000***
Yarn Count, WxF	14/1x9/1	21/1x16/1
Yarns/inch, WxF	86x57	116x80
Yarn Twist/inch, Z direction, WxF	17x12	20x16
Fabric Weight, oz/yd²	9.0	8.2
Fabric Weave	5 Harness Sateen	5 Harness Sateen
Fabric Breaking Strength (Grab) lb, WxF	Counter of 2 146x161	Counter of 2 164x140
Fabric Tearing Strength (Elmendorf) lb, WxF	7.9x11.2	9.7x10.1
Flat Abrasion Resistance (Stoll) 4-lb pressure, 1-lb head, O emery, cycles		
Warp face	610	1445
Filling back	1330	1174
Flex Abrasion Resistance (Stoll) 4-lb tension, 1-lb head, Blade #288		
Warp face, WxF	590x850	19,800x13,200
Filling back, WxF	760x620	18,500x9,810
Accelerotor Abrasion % Weight Loss—16 min	38.0	14.0

* Water repellent treated.
** These figures essentially represent the strength of the cotton fibers in the blend since the nylon fibers elongate and do not break.
*** These figures are the actual strength of the cotton fibers removed from the cotton/nylon blend (unused).

[2]Method No. 3—Fiber Analysis by Chemical Separation—described in the Technical Manual of the American Association of Textile Chemists and Colorists, 1960, pp. 49-50.

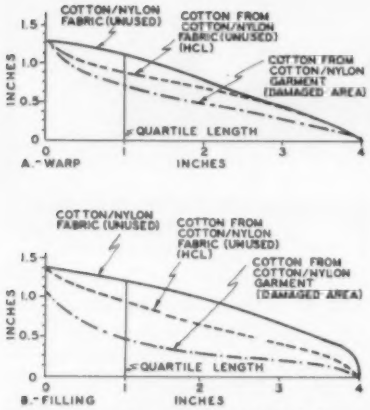


Figure 2. Staple arrays of blended fibers.

TABLE 2. Staple Array Data

		Longest Length (in.)	Shortest Length (in.)	Mean Length (in.)	Quartile Length (in.)	Unif. Ratio (%)
Standard All-Cotton Fabric (Unused)	W	1 14/32	2/32	24/32	31/32	77
	F	1 9/32	2/32	22/32	30/32	76
Standard All-Cotton Garment (Damaged Area)	W	1 6/32	1/32	17/32	22/32	78
	F	1 3/32	1/32	14/32	17/32	84
Cotton/Nylon Fabric (Unused)	W	1 9/32	2/32	27/32	1 3/32	77
	F	1 12/32	5/32	30/32	1 8/32	74
Cotton from Cotton/ Nylon Fabric (Unused)	W	1 9/32	2/32	22/32	30/32	70
	F	1 22/32	2/32	23/32	1 1/32	70
Cotton from Cotton/ Nylon Garment (Damaged Area)	W	1 9/32	2/32	17/32	23/32	75
	F	1 5/32	2/32	13/32	15/32	88

NOTE: All staple arrays scaled to 4 inches in length. See appendix for method.

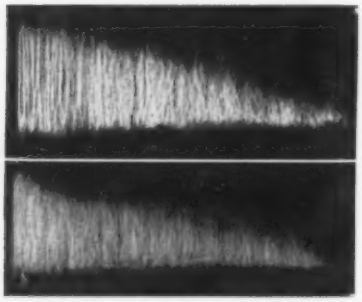


Figure 3. Typical staple arrays. Top: Fibers from warp yarns of the cotton/nylon blend. Bottom: Cotton fibers from warp yarns of the cotton/nylon blend.

short end there is no difference at all. The quartile[3] lengths of the two arrays are identical.

Staple arrays of fibers from the worn garments and from the same fabrics unused were prepared and the diameter of the fibers was measured, as prescribed by procedures described in the ASTM Manual. Twist of the yarns was determined by the untwist-twist method described in Federal Specification CCC-T-191b.

The relative distribution of the nylon and cotton fibers within the yarn structure was determined by imbedding the yarns in isobutylmethacrylate which, after hardening, was further imbedded in paraffin. Cross sections (of the cotton/nylon blended yarns removed from unused fabrics) were cut from the prepared specimens, by means of a microtome, to a thickness of 15 microns. These cross sections were magnified 500 times by a projecting microscope and sketches of the fiber outlines from the projection were made.

Results and Discussion

Fiber Length. Staple arrays made from fibers removed from the cotton/nylon yarns of the unused fabric revealed a rather uniform distribution of the cotton and nylon fibers, ranging from a maximum of 1 9/32 to 2/32 inches in the warp direction and from 1 12/32 to 5/32 inches in the filling direction. The quartile lengths for the warp and filling directions were 1 3/32 and 1 8/32 inches, respectively.

When the nylon fibers were dissolved from the unused cotton/nylon blend, it was found that the extremes of the distribution for the cotton fibers were practically identical for both the warp and the filling yarn systems. However, a rapid drop-off in length occurred at the long fiber end, which indicates that very few long cotton fibers were present in the blend. In the warp direction, it was noted that at the tail-end of the distribution the staple array for the cotton removed from the unused cotton/nylon fabric was quite close to that of the cotton/nylon itself. In the filling direction, the differences in the distributions persisted throughout the entire range of fiber length. The quartile lengths noted in the case of the cotton removed from the cotton/nylon fabric were 30/32 and 1 1/32 inches for the warp and filling directions, respectively. This amounts to an average reduction of 11/32 to 21/32 inches.

Quite marked changes in the staple arrays were noted in the damaged cotton fibers removed from the blended yarns taken from the damaged areas of the worn garment. In the case of the warp yarns, the longest and shortest fiber lengths were equivalent to those found in the undamaged areas of the fabric. The quartile fiber length dropped from 30/32 (unused) to 23/32 (damaged) inches. On the other hand, in the filling direction at the high end of the distribution the longest length observed decreased from 1 22/32 inches in the unused fabric to 1 5/32 inches for the damaged fabric. The quartile length decreased in the filling direction from 1 1/32 (unused) to 15/32 (damaged) inches.

It is interesting to note that although the greatest decreases in quartile fiber length occurred in the filling yarns, as would be expected in garments made with the filling side of the fabric to the outside, nevertheless a significant decrease in mean fiber length occurred in the warp yarns also.

Detailed data for the staple arrays are given in *Table 2;* the boundaries of the arrays are sketched in *Figure 2;* and photographs of typical staple arrays are shown in *Figure 3.* Uniformity ra-

[3]Quartile Length—The fiber length lying 25 per cent of the distance along the frequency axis measured from the end of the array composed of maximum lengths.

tios are tabulated in *Table 2*, but the significance of their measure for blended yarns, and particularly for damaged yarns, requires considerable interpretation.

From this type of analysis, cotton appears to be the fiber which is significantly damaged in a cotton/nylon blend of this type. This raises a question as to the engineering design concepts that could be employed to raise the level of the contribution of the nylon. As indicated in a later paragraph on yarn cross sections, more careful attention may have to be given to the relative diameters of the cotton and the nylon fibers in order to obtain, for a given blend composition, an optimum number of fibers of each type.

The staple arrays of fibers removed from the all-cotton fabrics that had been tested on the combat course *(Figure 4)* demonstrate a trend similar to that noted for the cotton/nylon fabrics. In the all-cotton fabrics, however, the fibers removed from the damaged areas showed a decrease in maximum length as well as in minimum length. However, as in the case of the cotton/nylon blends, there appeared to be less loss of short fibers in the warp yarn system and the over-all reduction in the length of fibers was much greater in the filling than in the warp direction.

Yarn Twist. The twist per inch in the yarns depends, of course, on the yarn count and on the twist multiplier selected for the warp and filling yarn systems. The fiber fineness and length will have a bearing on the twist multiplier selected, since long fibers or fine fibers normally require less twist because of the greater number of points of frictional contact among adjacent fibers. However, as yarn count becomes finer more twist is needed to offset the loss in strength due to the reduced mass of the yarn structure.

The data in *Table 1* indicate that the twist multipliers used (4.50 x 4.00) for the warp and filling yarns were closer than normal. Conventional twist multipliers are 4.75 for the warp and 3.50 for the filling. Accordingly, any differences observed in the behavior of the yarns in the fabrics are presumably more a function of yarn count rather than of any other conventional yarn parameter. The counts of the yarn in the cotton/nylon blended fabric were 21/1 in the warp and 16/1 in the filling, whereas the respective yarn counts in the standard cotton fabric were 14/1 and 9/1.

Since the twist multiplier for the warp yarns (4.50) was less than that normally used (4.75), it is probable that the contribution of the warp yarns to the abrasion resistance noted would be less than in an optimally twisted construction. Moreover, it is conceivable that reduction in twist could affect the abrasion resistance of the finer blended warp yarns to a greater extent than the coarser cotton warp yarns because of the smaller mass of the former. On the other hand, the twist multiplier in the filling direction was higher (4.00) than normally used (3.50). If this value is above the point of optimum twist in the strength-twist relationship it could lead to more rapid failure as a result of both reduced strength as well as the tendency toward stiffening of the yarn at the higher twist levels. In addition, the higher count (small diameter) of the cotton/nylon blended yarns reduces the over-all number of fibers in the cross section of these yarns, which would naturally lead to a greater percentage loss in stress support value as individual fibers are abraded.

Fiber Diameter and Distribution. The denier of the nylon staple used in making the blended fabric was 2.2. The equivalent denier of the cotton fibers was approximately 1.5. Since the density of nylon is 1.14 as compared to 1.54 for the cotton, it would be natural to expect the cross-sectional area of the nylon fibers to be considerably larger than that of the cotton fibers. This is confirmed by sketches made of yarn cross sections *(Figures 5* and *6)*.

What seems to be even more important from the standpoint of wear, however, is the rather uneven distribution found of the nylon and cotton, particularly in the warp yarns. The nylon fibers appear bunched and not at all uniformly distributed throughout the yarn structure. Obviously, this poor distribution must have resulted when the fibers were blended in sliver form at the drawing operation. Probably a much more uniform blend could have been produced by blending the fibers in

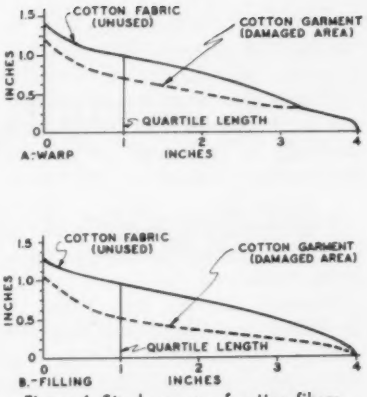


Figure 4. Staple arrays of cotton fibers.

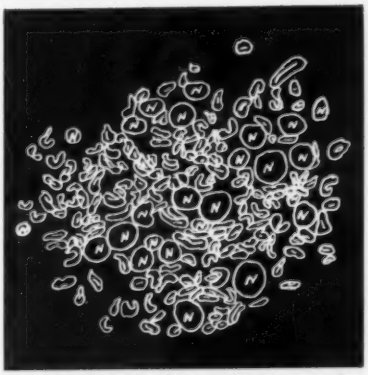


Figure 5. Drawing of warp yarn cross section (about 225 diameters).

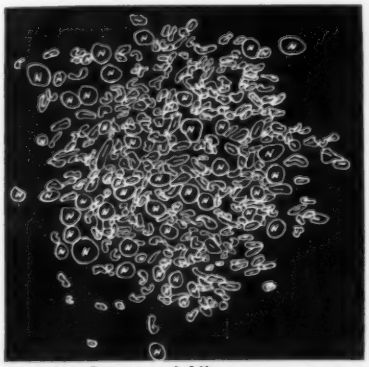


Figure 6. Drawing of filling yarn cross section (about 150 diameters).

a sandwich configuration prior to the picking process. It is difficult to assess the influence of this non-uniformity on abrasion resistance, but in the absence of data to the contrary it is logical to assume that it may be a significant factor.

Fiber Strength. Strengths of the all-cotton and cotton/nylon fibers were measured by the Pressley technique. During the course of the measurements, it was observed that the nylon fibers stretched up to the point at which the load was transferred to the cotton fibers. After this, rupture occurred, and as anticipated in tests of this type on blended materials, the nylon fibers contributed load-supporting value only up to the point of rupture, the point at which their elongation was equivalent to that of the cotton fibers. Thus, a major portion of the strength of the nylon fibers is not realized in a blend of this type.

This observation was further confirmed by tests made on the fabrics (results included in *Table 1)* which showed the Pressley strength of the cotton fibers removed from the cotton/nylon blend to be practically identical to that of fibers from the all-cotton fabric. Thus differences in performance between the two fabrics cannot be attributed to differences in cotton fiber strength.

Microscopic Examination of Fabric. Microscopic examination of the worn areas of the cotton/nylon fabric confirmed the observation from the staple arrays that the cotton fibers abraded and ruptured first, thus leaving relatively few nylon fibers in a yarn cross section to sustain the wear action. It is conceivable that, in a sense, the presence of the relatively large nylon fibers may have contributed to the more rapid failure of the cotton under the rather unusual wear conditions.

Conclusions. It is evident from this study that more attention must be given to the microstructure of the yarns and fibers in blended materials of this type before causes can be assigned to wear failure and before constructive engineering design steps can be taken to enhance wear resistance. Rather than drawing any definite conclusions from this rather cursory study, it would be desirable to consider the factors that have been observed in this experiment and use these as a basis for planning a more definitive study in which a more precise assessment can be made of the role of such factors as fiber density, fiber diameter, fiber length distribution, yarn count, and yarn twist on observed wear. It is anticipated that experiments involving a consideration of this great variety of parameters will be undertaken in the future as part of the planned development program on cotton/nylon blended fabrics.

Acknowledgements
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Appendix
Method for Scaling Staple Arrays

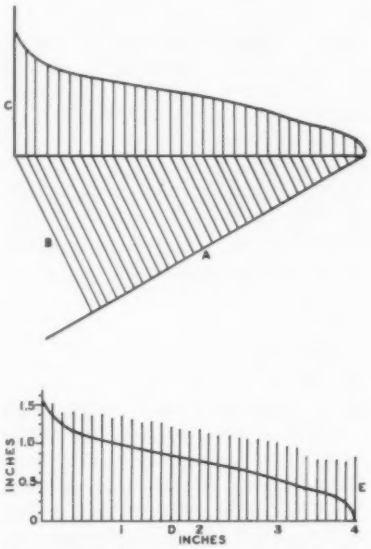


Figure 7. Scaling an array to a 4" length.

1. A 4-inch line (A) is drawn at any angle from the right end of the base line of a staple array diagram, but passing under it.
2. The 4-inch line (A) is subdivided into 32 equal parts.
3. A line (B) is drawn connecting the free end of the base line with the free end of the 4-inch line (A).
4. Lines parallel to (B) are drawn from each of the division points on line (A) to the base line.
5. Perpendicular lines (C) are erected on the base line at each of the points where it is intersected by a parallel line (B).
6. A new base line (D) 4 inches in length is drawn and divided into 32 equal parts.
7. From each of the division marks on the new base line, perpendicular lines (E) are erected.
8. Using a pair of dividers, measure the length of each of the lines (C) and plot the length on the corresponding lines (E).
9. Connect the plotted points above the new base line to form a curve.

How quality control can boost profits

■ QUALITY either in excess or below a set standard for a given product will adversely affect profits, Thomas E. Stribling, Jr., of Werner Textile Consultants told members of the Textile Quality Control Association.

"A quality control program is just as important in the manufacture of low-end products as it is in turning out the highest quality merchandise as far as profitability is concerned," Mr. Stribling said.

In order to maximize the profit potential to which a quality control program can contribute, the speaker cited the following:

1. The level of quality standards and quality control must be right for the product and for the market.
2. Maintenance of product quality at consistent levels is essential.
3. A quality control program must be so designed that its cost does not become out of proportion to the total cost of the product.

Mr. Stribling also pointed out that publicizing the existence of a quality control program can enhance a mill's profit potential. By such publicity and advertising, for example, customer confidence can be developed and the company's reputation and product acceptance improved.

Give operatives a PERSONAL HOLIDAY

instead of July 4, Labor Day, or some other national holiday.

This costs less. Employees like it, too

by Jack Soloff
Senior associate in charge of labor relations consulting Leon Henderson & Associates

Exclusive

NON-PRODUCTIVE payroll costs, which consist mainly of fringe benefits, have been increasing at a pace faster than wage rates. According to a recent nationwide management survey, the average cost of fringe benefits in the textile products and apparel industry amounts to 15 per cent of total payroll costs.

Fringe benefits are certainly not new. Many textile companies have been granting a variety of fringe items for years. It was, however, during the World War II while the War Labor Relations Board controlled labor-management relations that fringe benefits realized their greatest development. Since then, the concept of fringe benefits has broadened and gradually become more costly.

Today the cost of fringe benefits is great. Furthermore, it is likely that fringe costs will grow and continue over a period of years to represent a still larger percentage of total payroll costs.

In light of this trend, what can management do to keep the costs of fringe benefits down?

In this article we have taken one of the more important fringe benefits—holidays—and have attempted to answer this question.

Holidays are costly to management for two reasons: first, because payment is made for a day or days without receiving the benefits of production and, secondly, because a premium rate usually must be paid for work performed on a designated holiday. This problem is common to both union and non-union textile plants.

Aside from management's capacity to turn union demands down, the traditional method at management's disposal for reducing holiday costs is found in the language of the labor agreement.

Most contracts that provide paid holidays incorporate eligibility requirements for an employee to meet in order to qualify for payment. The most common provision requires that an employee must work the last scheduled workday before and the first scheduled workday after the holiday in order to qualify for holiday pay. This provision helps to avoid abuse resulting from an employee converting a holiday into a "short vacation." Other labor agreements require that a paid holiday must fall on an employee's regularly scheduled workday, while still others specify a minimum service requirement in order to be eligible for a paid holiday.

Give a Personal Holiday. Apart from tightening the contract language, a remarkably simple but effective innovation in the area of paid holidays is the *personal holiday*.

Employers that have negotiated the personal holiday into their contracts in lieu of a traditional national holiday have realized considerable savings. Non-union employers have profited equally well.

Anyone familiar with labor cost problems is aware of the various costs that can result from payment for national holidays such as Thanksgiving, Independence Day, and Labor Day. On such days the plant is shut down and employees are often paid for the day. When the employees are required to work on such holidays, they are usually paid 1½ time or double the regular rate for all work performed.

The personal holiday, however, never requires the plant to be shut down and never involves an employer with a premium rate. Personal holidays are spread out over the entire work year with the employer usually in control of the scheduling.

What Day? Any one of a variety of days may be designated as a personal holiday. Personal holidays that have been used are an employee's birthday or anniversary (either employment or wedding). Still other employers allow an employee to take an extra day of vacation or use the day for personal business. The fact is, that an employee may use any day of the year provided it meets

with management approval. In any case, whether the day is designated or left open, the employee is required to give adequate notice, usually thirty days, before he takes the personal holiday.

Cost Is Negligible. Personal holiday provisions that I have negotiated with various unions have resulted in little or no additional cost to the employer and with virtually no loss of production. In all, non-productive departments such as maintenance, shipping, office, custodial, and service, the absence of one or two employees usually has only slight effect on operating efficiency.

Even departments directly involved in production seem to experience no loss in output resulting from the absence of an employee on a personal holiday. Usually the employee's co-workers are each able to put forth a little extra effort in order to meet accustomed production requirements, or the employee himself is frequently able to recoup lost production upon returning to work.

Use it when Bargaining. The personal holiday can play a vital role during union contract negotiations. During this time a personal holiday can be offered effectively as the necessary compromise in order to break deadlocked discussions involving a demand for a national holiday that appears to be a union "must" item. In addition, a personal holiday can be exchanged for a reduction in the premium rate for holiday work or for an observed national holiday.

What makes the personal holiday a peculiarly useful tool for management during contract negotiations is that it receives much greater credit from the union and employees than its cost represents to management. And in many instances the personal holiday has met with equal acceptance from both sides of the bargaining table. To that extent, the personal holiday has also assisted in the collective bargaining process.

5% more production, 20% fewer employees seen for industry in 1970

■ BY 1970 the output of the textile industry in the United States could increase by about 5 per cent; on the other hand, textile employment will probably drop by about 185,000 persons.

This prediction on U. S. textile industry production and labor force in 1970 is from an article in a recent issue of *New England Business Review* which was drawn largely from the study, "New England Textile Employment in 1970," by Prof. William H. Miernyk of Northeastern University. [Prof. Miernyk presented a more optimistic report at the 1959 annual convention of the Northern Textile Association. See TI for Nov., 1959, page 139.—Eds]

This study is one of a series of 1970 projections for the New England economy sponsored by the Federal Reserve Bank of Boston. It was pointed out that in this projection it has been assumed that between now and 1970 there will be no fundamental change in the economic organization of the United States and in our relations with other countries, that there will be no major technological breakthrough in textiles, and that there will be no major change in our international trade policy. Furthermore, it was stated that the projection will undoubtedly be in error if these assumptions are not realized.

Other predictions from the article follow:

Exports and Imports. Exports now account for about 5 per cent of the national production. By 1970 they may represent only 3.6 per cent.

The future of imports depends entirely on future trade policy. What appears most likely is that textile imports will continue to increase, but at a declining rate.

Population and Consumption. If the population of the United States increases during the next decade by the anticipated 20 per cent or more, domestic textile production will probably increase substantially. Much, however, depends on trends in per capita consumption. Past declines have reflected the sharp curtailment in industrial demand for fibers and fabrics. Paper, plastics, aluminum foil, and other light metals have been increasingly substituted for textile fibers and fabrics. This trend will continue.

This projection assumes a decline of slightly over 5 per cent in per capita consumption of all textile products during the next decade. This is about one half the rate of decline during the postwar era. Such an improved situation combined with a substantial population increase would help to stabilize the textile industry.

New England's Future. Textile industry production in New England will probably remain constant, but employment will probably drop by about 40,000 persons. Today New England has about 13 per cent of U. S. employment; in 1970 it may have only 10 per cent.

Only modest shifts in the industry's employment within New England are anticipated over the next decade. Massachusetts with 40 per cent and Rhode Island with 24 per cent of regional textile employment are expected to maintain their relative importance. On the other hand, a larger decline is expected in Connecticut than in Maine and this may well reverse their current shares of 13 and 12 per cent by the year 1970.

Within the textile industry in New England there will be vigorous growth, stagnation, or liquidation, depending upon the individual company and its particular situation. Much depends on the ability of New England firms to finance the necessary capital expenditures and to take advantage of modern laborsaving devices.

There will likely be a continued movement away from broadwoven textile manufacturing and an increasing emphasis on the more competitive specialty items.

Authorities expect that the social costs of the expected employment cutbacks will be much less serious than in the past. Job losses will be spread out over a longer period of time and they will probably come about through retirement of older workers and layoff of younger and more mobile workers.

Choosing the Best Draft

Effects of sliver weight and uniformity, roving and spinning draft distribution

In the May 1960 issue of TEXTILE INDUSTRIES *(pages 209-210, 213, 217, 219, 223, 225, and 227) appeared an article, "Choosing the Best Draft," by Jack Simpson, Arsema T. Callegan, and C. L. Sens, of the Southern Regional Research Laboratory at New Orleans, La. After publication of the article, the editors received some interesting comments from W. Nutter, director of T.M.M. (Research) Ltd., a research organization supported by the major textile machinery manufacturers of England.*

Mr. Nutter's comments are reproduced below, followed by the authors' reply.—The Editors.

THE EDITORS:

A number of vital factors are touched upon in an excellent publication in your columns by Simpson, Callegan & Sens, and while the results are certainly valid and agree closely with many of our own findings, I am not sure that the figures are correctly interpreted due to the interaction of variables which are almost impossible to control in such a comprehensive experiment.

For instance, the quality of a card sliver is not necessarily reflected by its uniformity, nor is the card draft in itself a vital factor in sliver quality. It is true that light laps and light slivers are essential for high quality carding, but this is a function of licker-in and doffer action rather than machine draft.

The effect of mean level on measured uniformity of slivers is to automatically bias the results in favor of coarser hanks at the first passage of drawing, and a low speed-frame draft for a given roving hank will bias the second passage sliver towards finer numbers. It is our experience that sliver weight at the draw frame is not very critical, but it is important to apply a certain minimum draft between card and speed frame for adequate fiber parallelization, and it is also important that the draw frame draft should match the drafting system used[1]. The former requirement is influenced by the relationship between hooked fibers in the card sliver and fiber length[2]. Higher pre-speed-frame drafts are required for longer staples.

Optimum draft distribution between speed frame and ring frame depends upon a variety of factors, including the drafting potential of the systems used at the individual machines. With the drafting systems in current use some three or four years ago, it was proved that equal draft distribution between the two machines gave the best results. The accompanying diagram, where yarn strength is plotted against draft distribution, shows the results obtained at that time from combed and carded cottons.

Recent work on single-zone drafting has largely invalidated these results, and experiments still in progress indicate a swing towards lower speed-frame and higher ring-frame drafts for optimum yarn quality. Figure 2 in the published article by Simpson et al is, in fact, a classical example of our own findings on ring-frame drafting.

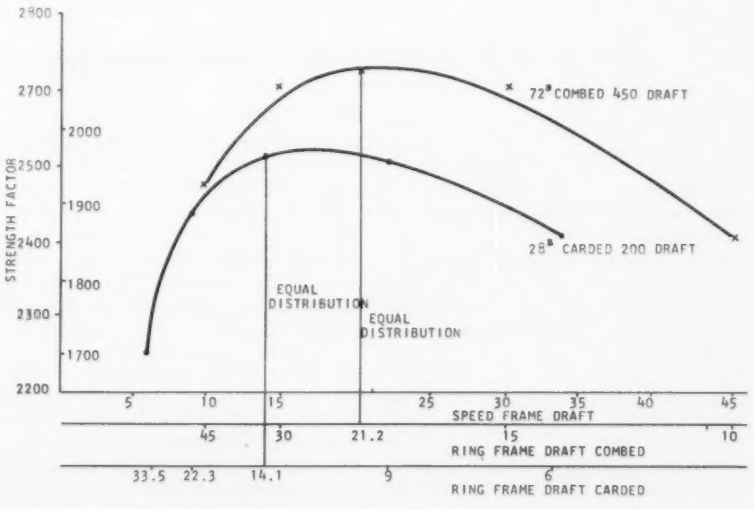
W. NUTTER
Director
T.M.M. (Research) Ltd.
Helmshore
Rossendale, Lancs.
England

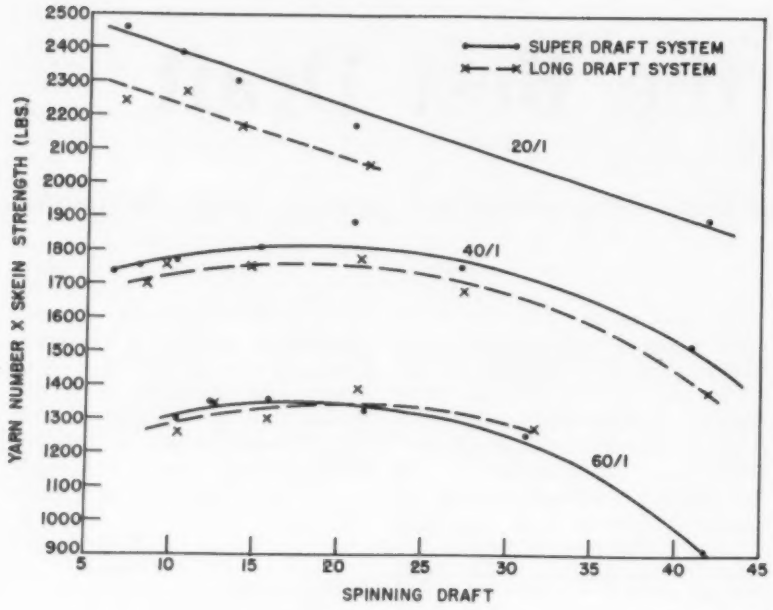
References

1. Methods of Drafting in Staple Fibre Spinning, *Textile Merc.* **143**, 86-88, 98 (July 15, 1960).
2. Fibre Arrangement in Card Slivers and Its Effect on Subsequent Processing; paper given by W. Nutter at Institut Textile de France, June 1960 (not yet published).

THE EDITORS:

The authors are pleased with the interest shown by Mr. W. Nutter in the article "Choosing the Best Draft" and feel that he touched on several interesting points. A close examination shows that Mr. Nutter is in general agreement





with the findings brought out.

We concur with Mr. Nutter that uniformity is not the sole indication of card sliver quality. This was pointed out on Page 217 of the article, where the effect of fiber parallelization was discussed. However, within the range of drafts and doublings used in the investigation, it was postulated by the authors that the effect of uniformity overshadowed any differences due to the effect of fiber arrangement. Furthermore, the initial experiment on the Deltapine cotton strongly supported this point. It should also be pointed out that as the experiment was set up the effect of card draft included the effect of licker-in and doffer action.

So that there would be *no bias* as to the effect of weight (number of fibers per cross section) on mean uniformity, only the uniformity of like weight drawing slivers was compared. For instance, in Table 4 of the article the uniformity of the 45 grains/yard first drawing sliver from the 45 grains/yard card sliver should only be compared with the uniformity of like weight first drawing slivers from the 55 and 65 grains/yard card slivers.

In agreement with Mr. Nutter's experience, this investigation also showed that sliver weight at the drawing process was not as critical as sliver weight at roving or roving weight at spinning.

At present we are doing some work on measuring the fiber parallelization of card and drawing slivers. We are finding that the curliness, incline angle, number and direction of hooked ends of the fibers affect the method of drafting the slivers to improve the fiber parallelization. Preliminary experiments indicate that a small draft at first drawing and a large draft at second drawing would straighten hooked ends better than the present system of using approximately the same drafts at the first and second drawing processes. However, our work has not progressed far enough to draw definite conclusions.

We also agree that the optimum draft distribution between the roving and spinning processes depends on the potential of the drafting systems at the individual process to maintain control of the fibers. However, limited experiments performed at this Laboratory indicate that changing the drafting potential of the spinning drafting system (improving fiber control) sometimes does not change the optimum draft distribution between the spinning and roving processes, but merely increases yarn strength and uniformity. This is shown in the accompanying graph, where a 15/16" cotton was spun into 20/1, 40/1, and 60/1 yarns, first with the Whitin Long Draft System (straight nose bars with 7-mm opening, 55-mm width leather aprons) and then with the Whitin Super Draft System (slanted nose bars with 5-mm opening, synthetic aprons). However, as Mr. Nutter has shown, improvements in the roving and spinning drafting systems can change the distribution as well as the strength level.

JACK SIMPSON
ARSEMA T. CALLEGAN
CHARLES L. SENS
Southern Utilization Research
and Development Division
U. S. Department of Agriculture
New Orleans, Louisiana

Rise in U.S. apparel wool demand expected

■ A POTENTIAL rise in the demand for apparel wool in the United States during the next six months is anticipated by Ruth Jackendoff, director of economics and statistics for the Wool Bureau, Inc.

Low clothing stocks at retail expected as a result of the current cold weather, and reduced imports of low-priced wool textiles due to the recent tariff increase, are the two top contributing factors in Miss Jackendoff's projected reversal in the recent decline in demand for wool apparel fabrics.

The world supply-demand position for wool has held stable over the last decade. While wool production has increased steadily over the past ten years, consumption has tended to exceed production. There is no current basis for any presumption of a decline in world demand sufficient to depress prices from recent low levels, Miss Jackendoff said. Rather, there is more reason, on the basis of exceedingly low world trade stocks, to anticipate a strong buying movement during the spring season. Better average prices obtained for foreign than for domestic apparel wools reflect the more favorable statistical position of wool outside the United States during the past year, however.

Dynel's inherent wet strength and chemical resistance fit it for many uses other fibers break down under. Here a Dynel fabric liner is used in extractors to dewater chemicals.

How to crack the industrial fabrics market

A report on the industrial applications of Dynel fabrics

Exclusive

THE MAN-MADE modacrylic fiber Dynel* is expanding its foothold in a number of industrial markets despite growing competition from a variety of other man-made fibers and blends. It has already made formidable gains over cotton and nylon in wet filters, dry filters, work clothing, overlay fabrics, and industrial bags.

New markets in the auto and furniture industries appear to hold large potential as the result of such recently developed application techniques as vacuum forming. This method may provide "one shot" production of seating or arm rests, eliminating much hand labor.

Paced by fiber technology, the modacrylic, together with other man-made fibers, has been gaining a larger and larger share of the textile industrial market, once the exclusive domain of natural fibers. The industrial use of the synthetic fibers jumped from 26 per cent to 44 per cent between 1949-50 and 1957-58, the latest period for which statistics are available. The increase took place despite a decline in the total amount of fiber earmarked for industrial end uses.

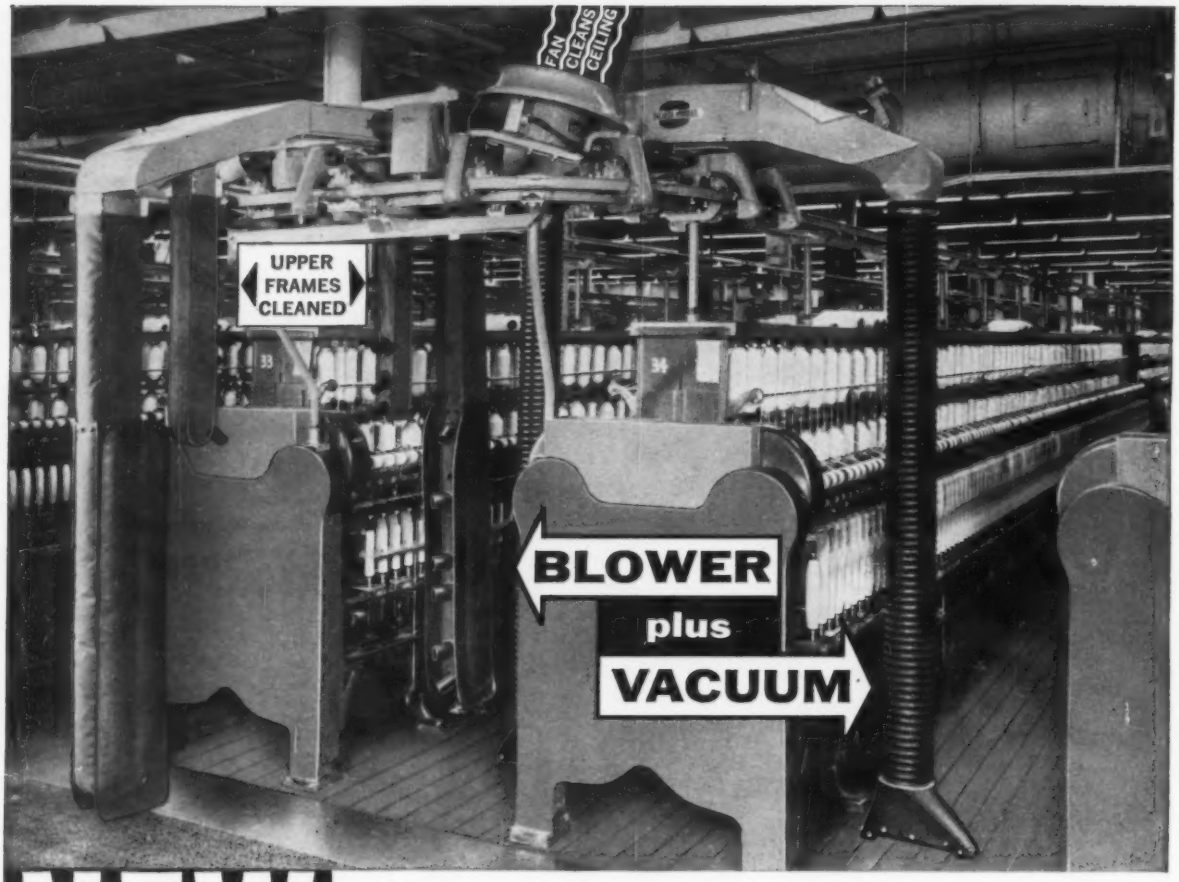
The history of the modacrylic as an industrial fiber, since its introduction 10 years ago, has been of conservative growth in many fields. It has taken its unique markets here and there, gradually building up a strong position in certain end use areas such as filtration and chemically resistant work clothes.

However, a number of factors suggest that it may be on the threshold of a new era of expanded industrial application.

Competition. The new fibers have made industrial textile consumers restudy their fiber needs. Marketing executives believe that the traditional, natural fibers stand to lose still more markets from competition by new man-made products, especially those synthetic fibers that have been developed to be outstanding in certain basic characteristics.

Price Stability. Dynel staple at $1.10 per pound has been a high priced fiber compared to cotton. It has held its own, however, among the nylons, acrylics, and polyesters, whether staple or filament, through a long period during which its producer has chosen to count heavily on the fiber's performance to sell the industrial customer. The result has been smaller gains than perhaps the discount- or price-cutting path could have produced, but now industrial accounts have become

*Trademark for a modacrylic staple made by Union Carbide Chemicals Co.



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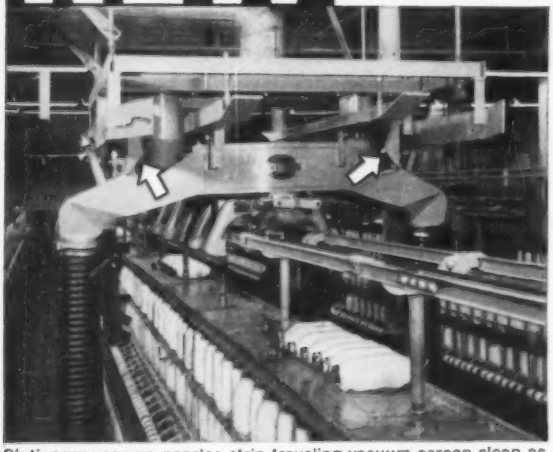

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solid boosters of the fiber.

Market Strategy. The producer has been careful to develop one market at a time, working closely with mills and end users. The result is a fiber firmly established, woven and nonwoven products, in filter markets as well as other industrial areas requiring a strong fiber with high chemical, electrical, and fire resistance.

Techniques adopted from the plastics industry have led to fabrics from the fiber being heat-shaped and deliberately stiffened in a permanent three-dimensional form as an acoustical cover on a high-fidelity speaker unit. Similar methods used in the plastics industry for shaping other thermoplastic sheets and films, including vacuum, plug or compression molding techniques, are adaptable to the shaping of fabrics made from this fiber.

In addition to seat and arm rests for furniture and automobile trade, the shaped material can be used for a variety of products such as soft shoes, slippers, product housing, and protective packaging.

Filtration. In the wet filtration field, the fiber now occupies a dominant position, as its chemical and mildew resistance, high strength, and ease of cake removal are essential factors in lowering replacement costs.

A good example of savings possible with the filter cloths comes from the sugar beet industry. A California processor switched from 16-oz cotton twill to modacrylic woven filters. His total filter costs dropped from 3.2 cents to 1.4 cents per ton of processed beets in the first year the modacrylic was used; his labor expenses dipped from 2.6 cents to 1.3 cents per ton.

The filter fabrics are also used in vacuum type swimming pool filter units to support a filter medium of diatomaceous or volcanic earth. The fiber's added performance features here are wet strength in the face of constant back-washing. The cloth withstands prolonged submersion in water, and strong acids and alkalies used in purifying pool water have no deteriorating effect on it.

Work Clothing. In the work clothing industry, steadily expanding sales of garments made from the fiber are reported as more cost conscious purchasing agents learn of their practical and economical features of chemical resistance and long wear life. Such work clothing outlasts conventional cotton work clothes as much as 15-20 to 1 in some situations. Translated into dollar terms for a purchase of 500 work clothes units, this has provided savings as high as $4,000 monthly. The clothes are being used by a growing number of coal miners, as it resists damage from sulphurous mine water and provides needed warmth in damp mine atmospheres.

Though the garments are higher generally in cost than cotton clothing, miners report the shirts and pants at $7 - $8 last approximately 110 days compared to 10 days for all-cotton garments.

Overlay Fabrics. The fabric is often used as a surface veil or overlay fabric that is applied on one or both sides of a glass reinforced plastic laminate. The coatings allow added protection for low pressure polyester, phenolic, or laminates against chemical and abrasion damage.

Industrial storage tanks, ventilating ducts, chemical sinks, exhaust hoods, and pleasure boats are typical of reinforced plastic units using the overlays. Fabrics for this purpose are available in a variety of woven, nonwoven, and knitted fabrics of various weights, for the particular application.

Other products in which the fiber has proven its practical and economical characteristics are pressure valve and pipe flange covers, dusting and car-wash mitts, floor wax applicators and all types of industrial and do-it-yourself paint rollers. In nonwoven form it occupies an increasingly important place in industrial applications. Felters Co., Boston, for example, has developed a nonwoven mat for use in a variety of industrial fields. It consists of a multiple web bound together in a resilient sheeting, and it comes in various thicknesses, densities, and surface textures to fit specific job requirements.

It is being used as a separator in nickel cadmium alkaline batteries for railway and marine diesels, lighting and alarm equipment, and for automotive lead acid batteries.

Other types of nonwoven modacrylic materials have been developed for filtering air and corrosive liquids, gaskets and weather stripping, reinforcing for plastic film, and sound absorbing material. The Kendall Company, Walpole, Mass., in particular, has developed a wide series of nonwoven films and constructions for various special purposes.

It's time to act on tax depreciation—MAPI

■ THE DISPARITY between tax depreciation here and abroad is dramatically documented in the January, 1961, issue of *Capital Goods Review*, a publication of Machinery and Allied Products Institute.

In a comparison of depreciation allowances in the United States with seven other industrial countries — Great Britian, Canada, West Germany, Sweden, France, Italy, and Japan—the findings with respect to productive equipment were reported to be as follows:

"In two of these countries the first-year writeoff exceeds 50 per cent of cost. In two more it exceeds 30 per cent. The corresponding figure for the United States is 13 per cent.

"Two countries permit a recovery of more than 70 per cent of cost in the first three years of service, and two more allow over 60 per cent. The American equivalent is 35 per cent.

"Only one country (West Germany) is in our class, and this one decelerated this year, after a period of greater liberality, as a brake on what was deemed excessive investment activity.

"In light of this nation's current concern over unfavorable growth rates in the United States in recent years as compared not only with the Soviet Union's, but with our principal competitors in the West," said MAPI president Charles W. Stewart, "we cannot afford to lose the potent stimulus to capital accumulation and to investment resulting from larger depreciation deductions."

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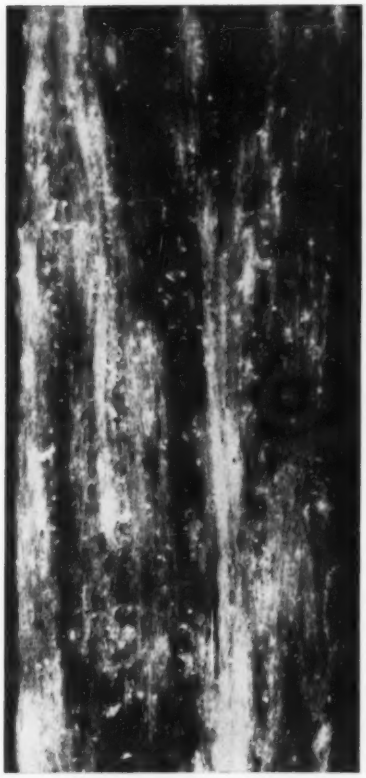


Figure 1. Web of first drawing sliver, containing 85% PA and 15% untreated cotton.

How to make PA cotton

Practical techniques for producing partially acetylated cotton fabrics in the mill

by Charles L. Sens, William G. Sloan, and Albert S. Cooper, Jr.
Southern Regional Research Laboratory[1]

Exclusive

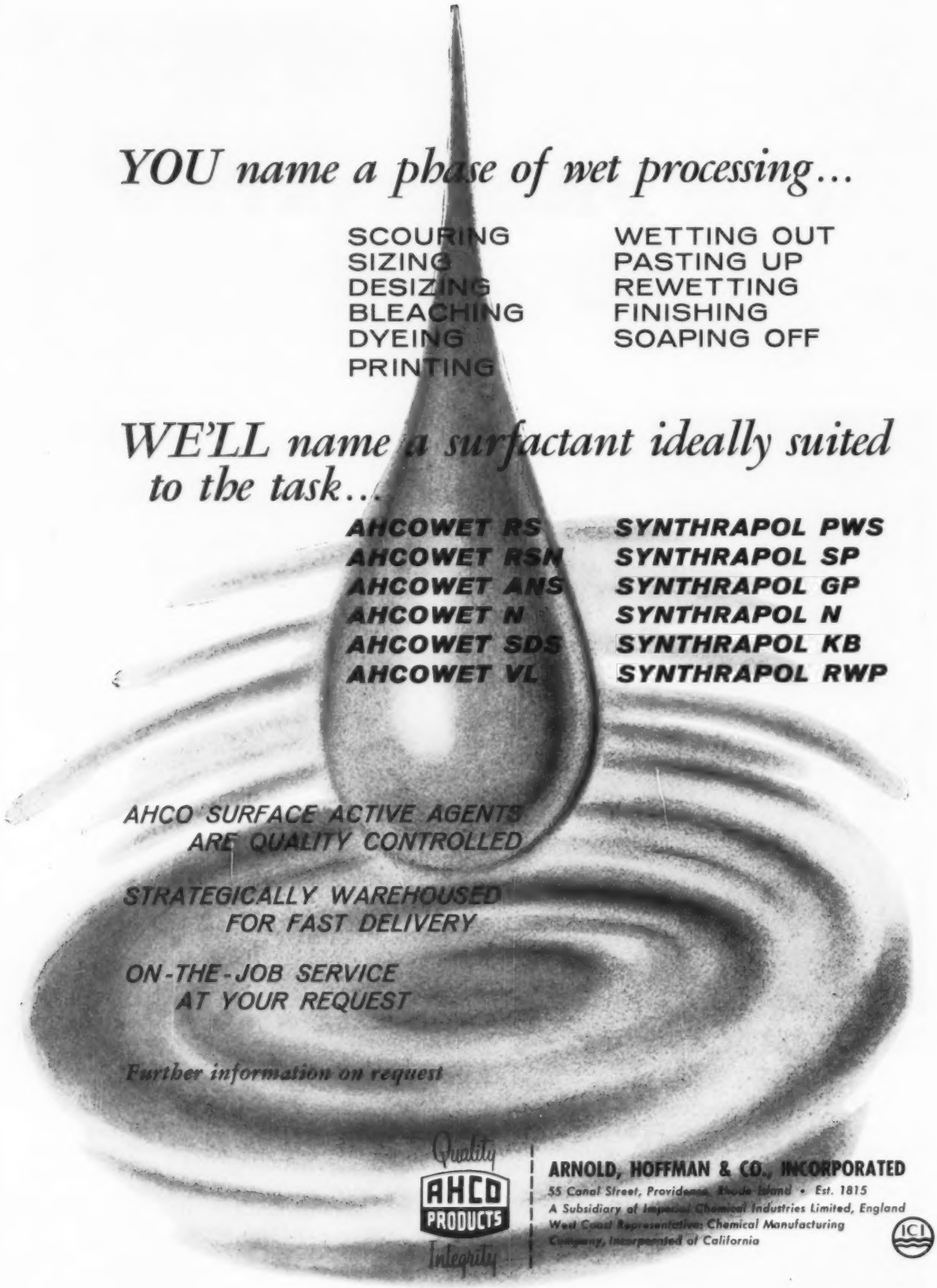
PREVIOUS publications by personnel of this Laboratory on the partial acetylation of cotton (4, 5)[2] have covered several phases of research in this field. These investigations have shown that experimental lots of partially acetylated (PA) cotton can be spun into relatively low quality yarn by using selected antistatic treatments or by blending in the ratio of 60% PA cotton and 40% untreated cotton.

The purposes of the present investigation are to determine the optimum percentage of PA cotton practical to use in blends from the standpoint of processing and heat resistance and to determine the stage of mechanical processing to yield a product that is optimum for acetylation by comparing the physical properties of PA fabrics prepared from (1) blended PA stock, (2) PA roving, (3) PA yarn, and (4) PA fabric.

This work is reported in two phases. The first phase covers

[1]One of the laboratories of the Southern Utilization Research and Development Division, Agricultural Research Service, U.S. Department of Agriculture. It is at New Orleans, La.

[2]Numbers in parentheses are literature references at the end of the article.



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Ring and Ball Softening Point, °C. (ASTM D-36-26)	104-108	104-105	110-111
Penetration Hardness (100 g./5 sec./77°F., tenths of mm.)	2	5	1
Color (liquid), Gardner scale, max.	2	2	2
Brookfield Viscosity (cps. @ 120°C.)	1500	400	455

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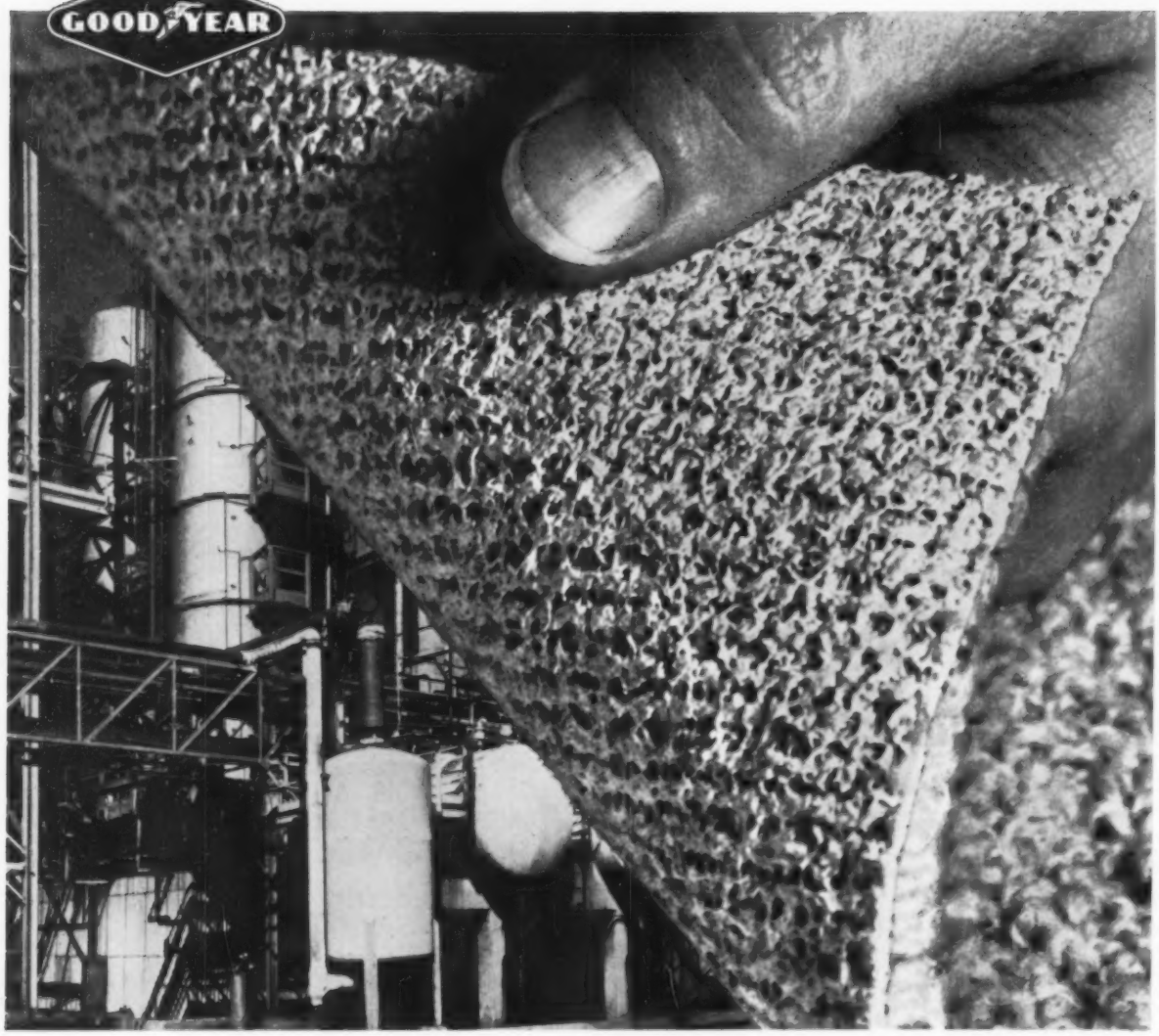

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About This Article

■ Investigations were conducted to determine the optimum percentage of partially acetylated (PA) cotton to blend with untreated cotton for processing into yarns and fabrics. It was found necessary to use a blend of 70% PA and 30% untreated cottons to obtain relatively good heat resistance and mechanical processing.

This blend was processed into a fabric for comparison with other fabrics produced from acetylated roving, acetylated yarn, and acetylated fabric. These comparable fabrics were evaluated by physical property measurements before and after heating for various periods at 160 C to determine at what stage of mechanical processing acetylation should be performed.

On the basis of these simulated service tests, fabrics acetylated in fabric form or as yarn were slightly better than the fabric produced from acetylated roving and considerably better than the fabric produced from a blend of acetylated and untreated cotton.

While various techniques for acetylating raw stock, roving, and yarn have been developed on a pilot plant scale, fabric acetylation is still preferable from a commercial standpoint. However, many industrial fabrics are either too tightly woven or too wide for acetylation as piece goods. For these types of fabrics, acetylation in yarn form would be the preferred method of treatment.

screening tests of five blends of PA and raw cottons from opening and cleaning through twisting into comparable yarn numbers. Physical properties of fibers at the principal stages of manufacturing are compared, together with relevant yarn properties and mechanical processing characteristics.

The second phase describes the different methods of preparation and physical properties of four comparable acetylated fabrics and two control fabrics. Comparative evaluation over a wide range of physical properties of these fabrics, emphasizing their resistance to heat at 160 C for various periods, are presented in this report.

Phase 1—Processing blended PA stock

Materials and Methods. The cotton used for acetylation was taken from a blend of five bales of Deltapine cotton of 1 1/16-inch staple length and having a Micronaire[a] (lg) reading of 4.6. The cotton was processed into 15-oz breaker laps, and then acetylated to 27% acetyl content in an especially adapted 50-lb capacity combination raw stock and package dyeing machine according to a procedure described in an earlier publication (5).

The following 20-lb lots consisting of a control and five blends were processed:

	Untreated Cotton %	PA Cotton %
Control	100	—
Blend	75	25
Blend	60	40
Blend	45	55
Blend	30	70
Blend	15	85

Mechanical Processing. The intention was to conform as closely as possible to conventional processing methods. The following is a list of machinery and, briefly, the organization used:

Opening. The treated and untreated lots were fed separately through the SRRL Opener (3), hopper feeder, Whitin Axi-Flo and Whitin down-stroke opener-cleaners, and collected in a hopper of the picker.

Picking. The laps were made on a Whitin combination breaker-finisher picker by the lap-blend method. Separate breaker laps of PA cotton and untreated cotton were made of calculated weights per linear yard so that feeding equal yardages of four laps in selected ratios on the apron of the finisher picker produced laps of the desired blend. Chemical analyses were made to check the percentage of PA cotton in the blends and these results indicated that all of the blends contained the desired percentage of PA cotton within ± 1%. The speed of the Kirschner beater was 1,000 rpm, fan speed 1,400 rpm. The grid bars were adjusted to a one-half opening. Weights of finisher laps were approximately 13 oz per yd.

Carding. The cylinder of the Whitin card was clothed with #90 wire and the doffer and flats were clothed with #100 wire. The card was equipped with a front fancy and a feed roll covered with garnett wire. Licker-in speed was 450 rpm. The sliver weight was 50 grains delivered at 8 lb per hour. The flat settings were: back 12-11-11-11-10 front. Other settings were normal for 1 1/16-inch staple.

Drawing. A Whitin four-roll drawing frame with synthetic cushion top rolls was used with six ends up, 50 grain sliver, two-process drawing.

Roving. A 1.50-hank (394 tex) roving was processed on a 10" x 5" Interdraft four-roll roving frame.

Spinning. The yarns were spun on a Whitin frame as 14s cotton count (42 tex) with twist multiple of 4.0. All yarns were spun from single creel roving on a double apron long-draft system using 3-inch ring and spindle speed of 5,500 rpm.

Twisting. The same twist multiple was used in plying the single yarns into 14/3 (42x2 tex) yarns on a Whitin twister, Model BB, 3" ring and 7" traverse.

Properties of Blends. The overall processing behavior and quality properties of the fibers and yarns were closely related to the percentage of PA cotton in the blends. The data in *Table 1*, with the exception of heat resistance, show how increasing the amount of PA

[a]Use of a company and/or product name by the Department does not imply approval or recommendation of the product to the exclusion of others which may also be suitable.

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TABLE 1. Carding Data, Fiber and Yarn Properties of Blended Lots

Blend		Carding Data				Fiber Length[2]		Yarn Properties (14s—42 Tex)					
			Strips						Breaking Strength[3]			Relative Strength After Heating at 160 C	
Untreated %	PA %	Neps/ Grain	Flat %	Cyl-Dofr %	Total Waste[1] %	UQ In.	Mean In.	Appearance Grade	Skein %	Single %	Elongation %	0 Days %	1 Day %	7 Days %
100	—	11.4	2.86	1.02	5.49	1.18	0.94	B	100	100	8.25	100	57	20
75	25	9.8	3.43	1.39	6.52	1.12	0.90	B—	87	87	8.45	87	67	26
60	40	6.0	3.90	1.67	7.91	1.13	0.88	C+	80	84	8.04	80	74	31
45	55	7.1	3.97	1.79	7.89	1.07	0.81	C	70	73	7.60	72	81	38
30	70	11.0	4.54	2.31	9.26	1.03	0.75	D	64	67	7.45	71	82	46
15	85	39.0	11.90	8.82	22.68	0.94	0.63	[4]	—	—	—	—	—	—

[1]Includes underneath card fly and scavenger roll waste from licker-in. Invisible loss not accounted for.
[2]Card sliver.
[3]Relative values, with 100% untreated, unheated yarn=100%.
[4]Impractical to process beyond first drawing.

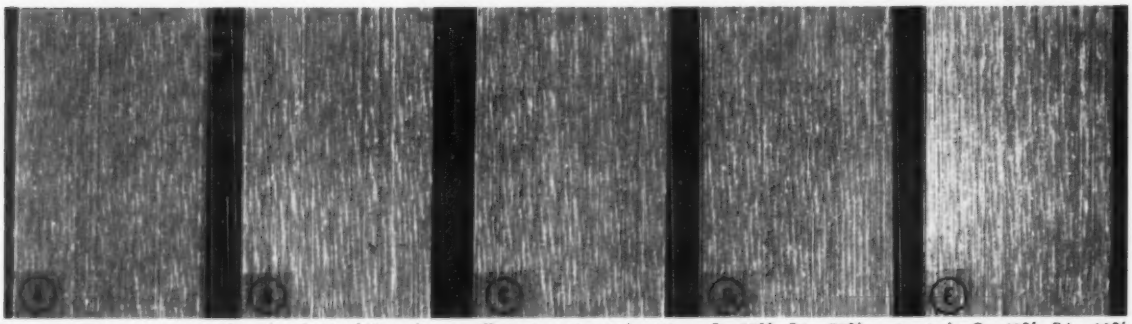

Figure 2. Yarn appearance boards of 14s (42 tex) yarn illustrate effect of increasing amounts of PA cotton in blends: A—100% untreated cotton; B—25% PA, 75% untreated; C—40% PA, 60% untreated; D—55% PA, 45% untreated; E—70% PA, 30% untreated.

cotton in the blend results in changed physical properties that are detrimental to good mechanical processing. As the per cent of PA cotton was increased in the blend, fiber length decreased, per cent waste increased, yarn appearance grade was lowered, and yarn tensile strength decreased. The nep count in the card web did not significantly increase until the higher percentages of PA cotton were used in the blends. Heat resistance, of course, showed an increase with larger percentages of PA cotton in the blend.

Figure 1 shows a web of 1st drawing sliver of the blend containing 85% PA cotton. It clearly illustrates some of the defects in drafting PA fibers. *Figure 2* illustrates the comparative quality as judged by the appearance of yarns containing different percentages of PA cotton. As the amount of PA cotton in the blends was increased the yarns showed increased cloudiness because of neps, naps, and thick and thin places.

Figure 3 shows the upper quartile and mean lengths of fibers from each blend found after each process from picking through spinning. The fiber length properties increased to a maximum at the drawing process and decreased appreciably at the roving with a partial length recovery after drafting at the spinning (before twist was inserted). This is the general pattern for untreated cotton as well as for blends of PA and untreated

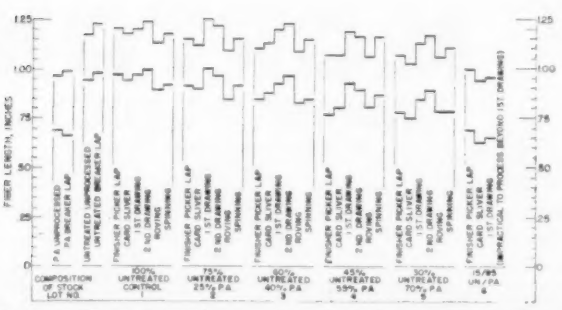

Figure 3. Effect of acetylation and mechanical processing on fiber length for processes from picking through spinning. Top bars represent upper quartile length; lower bars represent mean length.

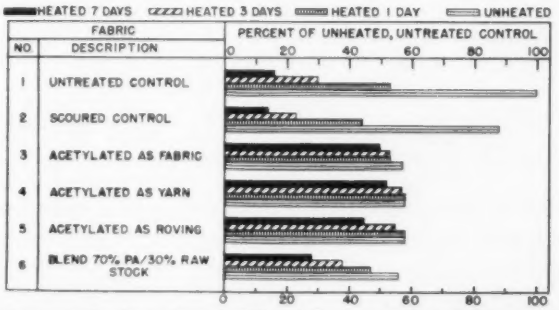

Figure 4. Breaking strength (1" strip) of controls and PA cotton fabrics; relative values after heating at 160 C for 0, 1, 3, and 7 days. Values are averages of warp and filling.

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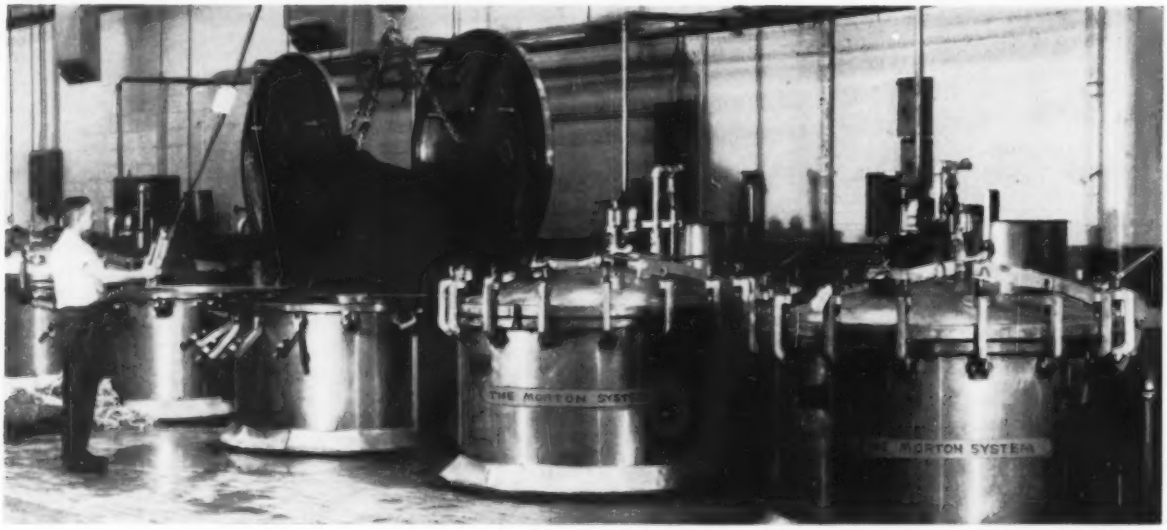

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cotton.

Although PA cotton fibers have the general appearance of cotton fibers, many of the fiber properties were changed sufficiently to affect processing. In fact, PA cotton should be considered a new fiber with its own individual processing characteristics. The following are some of the principal fiber properties that were changed as a result of partial acetylation: The weight increased because of the weight of the added acetyl groups. Diameter increased as measured by microscopical and Micronaire readings. The total volume of the fiber increased sufficiently to cause a reduction in density (2). The tensile strength and elongation of the PA cotton fibers were less than that of untreated cotton fibers. Moisture regain was reduced to approximately one-half that of untreated cotton, and the wax content reduced considerably which increased the harshness of the cotton fibers. A more comprehensive discussion of the effect of partial acetylation on fiber properties was given in an earlier paper (4).

Most of these changes in fiber properties caused by acetylation had undesirable effects on product uniformity and processing efficiency. The principal difficulties encountered were static electricity at carding and drawing, loading of the card, poor fiber separation, condensed drawing sliver, drafting waves at drawing and roving, neppiness, and uneven yarns. Many of these difficulties can be overcome sufficiently to permit processing by the use of antistatic treatments or by blending with raw cotton.

The processing characteristics of the five blends, as noted, varied according to the percentage of PA cotton present in the blend. The lot containing 85% PA cotton processed very poorly and was not processed beyond the first drawing. Although all of the other blends were processed into yarn, only the blend containing 70% PA cotton had sufficient heat resistance to be of further interest. Accordingly, a 55-lb lot of this blend was processed into a fabric for comparison with other PA fabrics discussed below.

Phase 2—PA fabrics

A total of five fabrics of comparable structures was woven on a Model XP, 42″ Draper loom for evaluation study. These included an untreated control fabric and four acetylated fabrics, where the acetylation was performed on raw stock, roving, yarn, and fabric. It is generally accepted that thorough purification of the cotton prior to acetylation improves the uniformity of the treatment and increases the heat resistance of the product. However, it has been found that PA cotton fibers that have been prescoured are excessively harsh and become densely matted, making it impractical to process them satisfactorily, particularly through the many drafting steps. Therefore, scouring was omitted on raw stock and roving, but was included on yarn and fabric.

The acetylation of stock and its processing have already been discussed. A brief description of how the roving, yarn and fabric were acetylated is as follows:

Acetylation of Roving. Roving was acetylated in a 50-lb combination raw stock and package dyeing machine using stainless steel perforated dye tubes 10½″ in length which were made by cutting off the ends of 6″ tubes and butt welding them. These tubes were placed over the roving bobbin and the roving processed on them so as to cover all perforations in the dyetube. Approximately 38 lb of 1.5-hank (394 tex) roving were acetylated to 20.7% acetyl content. No difficulty was experienced in spinning the acetylated roving into yarn.

The advantage of roving acetylation as compared to raw stock acetylation is that mechanical processing through roving is normal, resulting in more uniform and stronger yarn. Moreover, the heat resistance obtained is higher than that of yarn spun from blended stock.

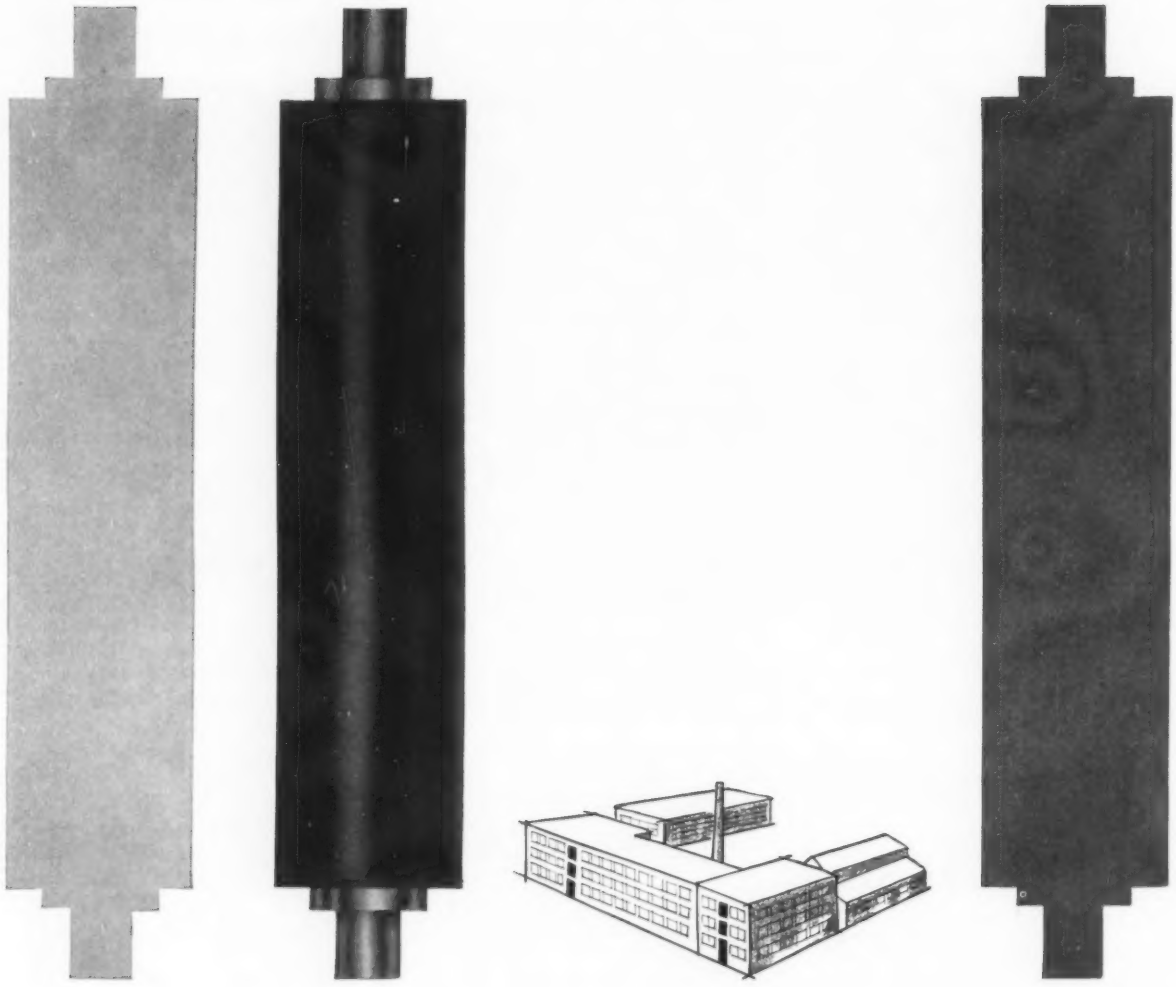
Acetylation of Yarn. Approximately 30 lb of 17/2 (35x2 tex) warp and filling yarns were scoured and acetylated in the 50-lb machine to 22.4% acetyl content. Yarn numbers after acetylation were 13.5/2 (44x2 tex) and 13.8/2 (43x2 tex) for warp and filling yarns, respectively.

Acetylation of Fabric. A fabric woven from 17/2 (34x2 tex) yarns was scoured and acetylated to 22.7% acetyl content on an enclosed jig equipped with a heat exchanger. Yarn counts of this fabric after acetylation were 14.4/2 (42x2 tex) and 13.4/2 (44x 2 tex) for warp and filling respectively.

Fabric tests

Table 2 shows an analysis of the four differently prepared PA fabrics, an untreated control and a scoured control fabric. These data indicate that the fabrics were nearly identical in structure. The fabrics were given a variety of selected tests to determine whether acetylation at different stages during processing materially affected fabric properties. These tests included breaking strength (1″ strip) (1a), elongation-at-break (1a), tearing strength by the Elmendorf method (1f), ball bursting strength (1b), flat abrasion resistance (1d), and flex abrasion resistance (1e), using the Stoll tester with a bar load of 4 lb and a head load of 1 lb, and air permeability (1c) using the Permeometer. Tests were made on all fabrics before and after heating for seven days at 160 C, and, for most fabrics, also after one and three days' heating.

Breaking Strength. The relative breaking strengths of the six fabrics after 0, 1, 3, and 7 days' heating at 160 C are shown in *Figure 4*. These data indicate that the four PA fabrics are approximately equal in strength before heating; but after heating, the fabrics acetylated as yarn and fabric are stronger. The heat resistance of the fabric made from blended stock is lower due to the presence of 30% of untreated cotton in the blend. It is interesting to note that the four PA fabrics before heating had less than 60% of the strength of



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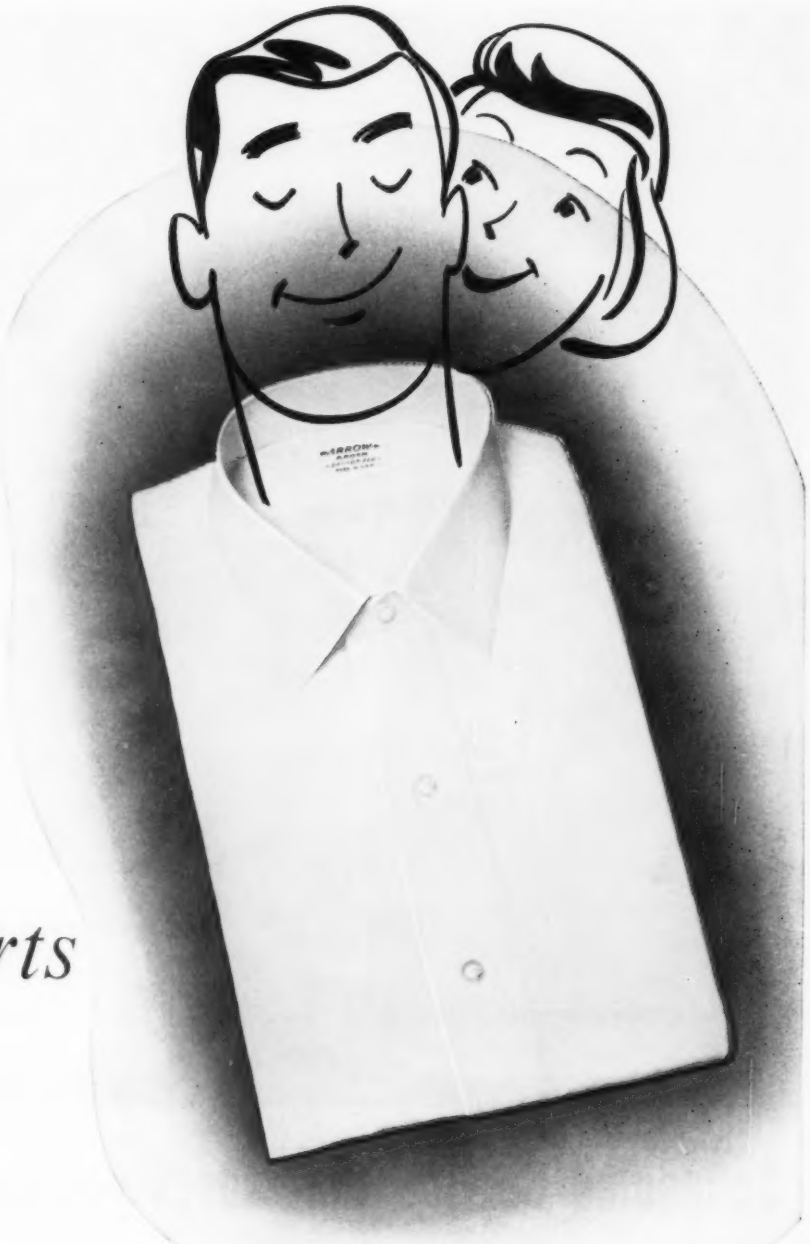

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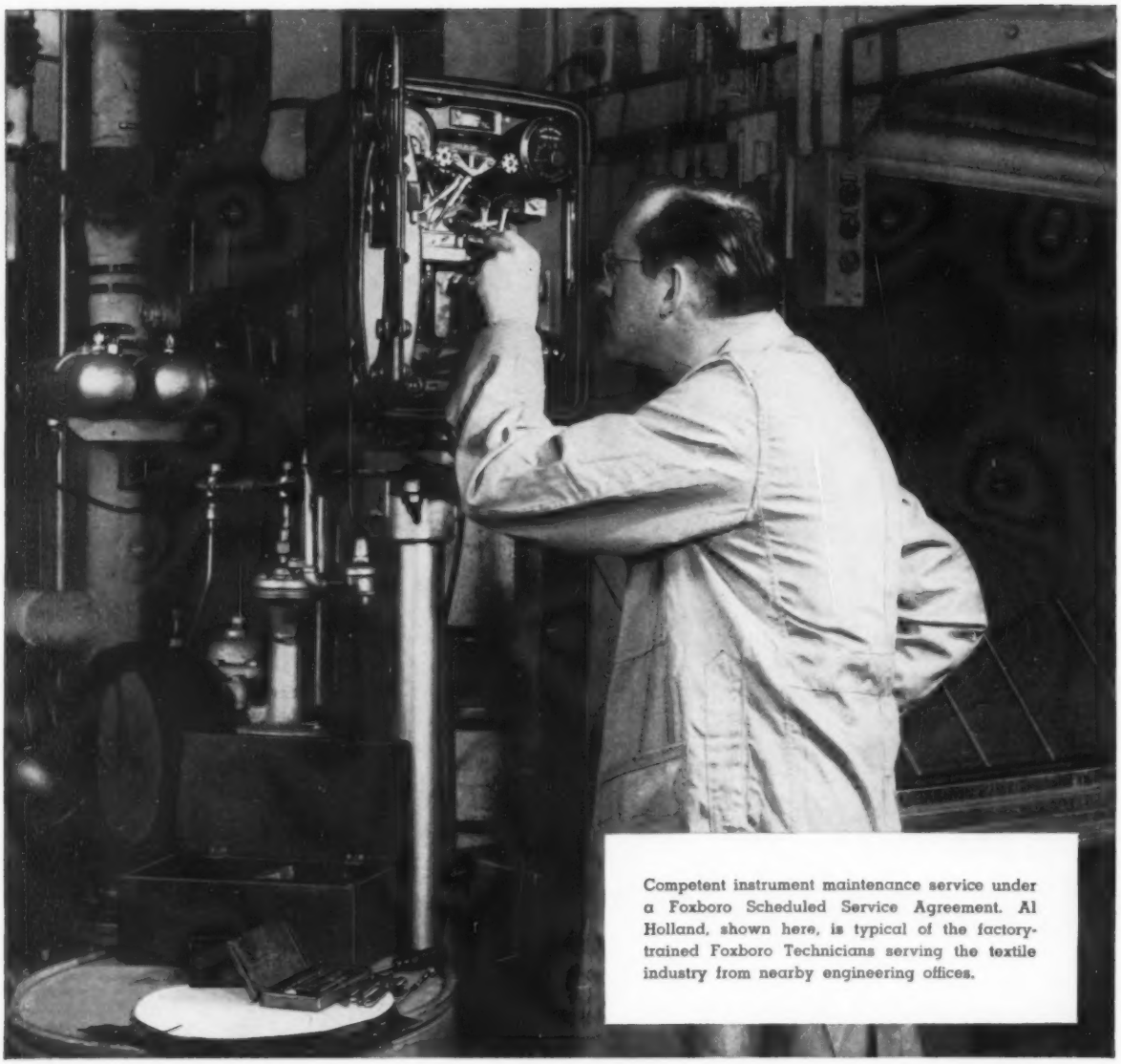

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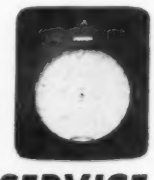

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TABLE 2. Selected Properties of Controls and Four PA Fabrics Acetylated at Different Stages of Processing

No.	Fabric Description	Wt Oz	Width In.	Count W X F	Gauge In.	Yarn Crimp W %	Yarn Crimp F %	Yarn Size[1] W	Yarn Size[1] F
1	Untreated Control	8.5	37	38 X 37	0.023	13.6	7.0	13.4/2	13.3/2
2	Scoured Control	8.5	36.8	38 X 39	0.025	12.8	7.5	13.7/2	13.8/2
3	Acetylated as Fabric[2]	8.0	37.7	38 X 37	0.022	2.5[3]	9.0	14.4/2	13.4/2
4	Acetylated as Yarn[2]	8.2	37.3	38 X 38	0.024	13.8	3.4	13.5/2	13.8/2
5	Acetylated as Roving	8.2	37.4	38 X 37	0.024	17.0	3.4	13.8/2	14.6/2
6	70% PA, 30% Untreated	8.4	37.2	38 X 37	0.024	16.0	4.7	14.4/2	14.0/2

[1]Basic yarn numbers: 13.0 (45 tex) warp and 14.0 (42 tex) filling.
[2]Fabric No. 3 and yarn of No. 4 scoured before acetylation.
[3]Three replicate tests showed approximately the same low per cent of crimp.

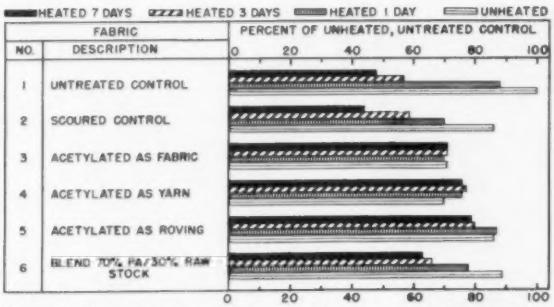

Figure 5. Elongation at break (1" strip) of controls and PA cotton fabrics; relative values after heating at 160 C for 0, 1, 3, and 7 days. Values are averages of warp and filling.

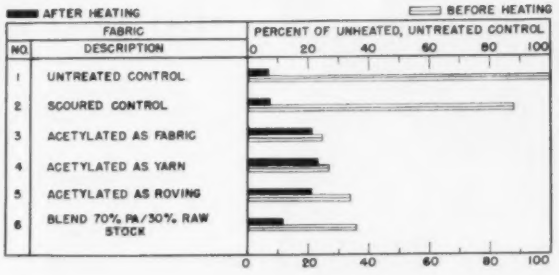

Figure 6. Tearing strength of controls and PA cotton fabrics; relative values after heating at 160 C for 0 and 7 days. The values shown are averages for warp and filling.

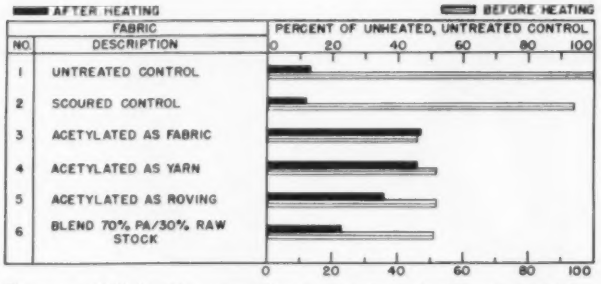

Figure 7. Ball bursting strength of controls and PA cotton fabrics; relative values after heating at 160 C for 0, 1, 3, and 7 days.

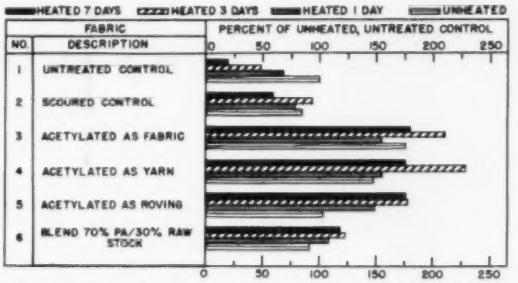

Figure 8. Flat abrasion resistance, controls and PA fabrics; relative values after 0, 1, 3, and 7 days at 160 C.

the untreated control, but after one day's heating they were approximately equal in strength to the control. After seven days' heating the best three PA fabrics were approximately three times as strong as the control.

Elongation-at-Break. *Figure* 5 shows the comparative elongations-at-break of these fabrics after heating at 160 C for 0, 1, 3, and 7 days. The fabric made from acetylated roving had slightly higher elongation than the other acetylated fabrics after all periods of heating. The fabric prepared from blended stock had the highest elongation before heating, but the lowest after heating, due again to the presence of untreated cotton in the blend. The effect of heating on the elongation of all the other acetylated fabrics was negligible.

Tearing Strength. Relative Elmendorf tearing strength values for the six fabrics before and after seven days' heating at 160 C are given in *Figure 6*. Tearing strengths of the acetylated fabrics before heating were only 22 to 36% of the untreated fabric, but after heating for seven days the actylated fabrics, except for the blend, had about three times the tearing strength of the untreated fabric. The blended fabric lost most of its tearing strength when heated, while the yarn and fabric acetylations retained most of their tearing strength upon heating.

Ball Bursting Strength. Data in *Figure* 7 show relative ball bursting strengths before and after being heated at 160 C for seven days. Before heating, the fabrics pre-

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pared from yarn, roving, and raw stock (the blend) acetylations were all slightly better than the fabric acetylation. After heating, the fabric and yarn acetylations were best.

Acetylated fabrics before heating had approximately half the strength of the untreated control fabrics, but after heating for seven days the PA fabrics had approximately 3½ times the strength of the untreated control. The ball bursting strength test rated the fabrics in much the same order as the strip breaking strength and Elmendorf tearing strength tests.

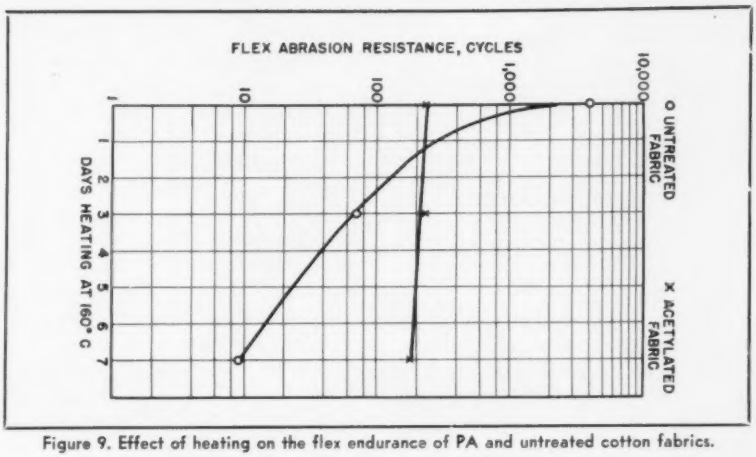

Figure 9. Effect of heating on the flex endurance of PA and untreated cotton fabrics.

Flat Abrasion Resistance. A comparison of the flat abrasion resistance of these fabrics is given in *Figure 8*[1]. Prior to heating, the fabric acetylated in fabric form had the best flat abrasion resistance, followed by the fabric made from acetylated yarn and fabric made from acetylated roving. After heating, these three fabrics were approximately equal in abrasion resistance. These three fabrics had 3½ to 4 times greater abrasion resistance than the untreated control fabrics before heating, and 8 to 9 times greater than the control after heating. The fabric prepared from blended stock had the least abrasion resistance of the PA fabrics, but still had nearly 6 times greater abrasion resistance than the untreated control after seven days' heating.

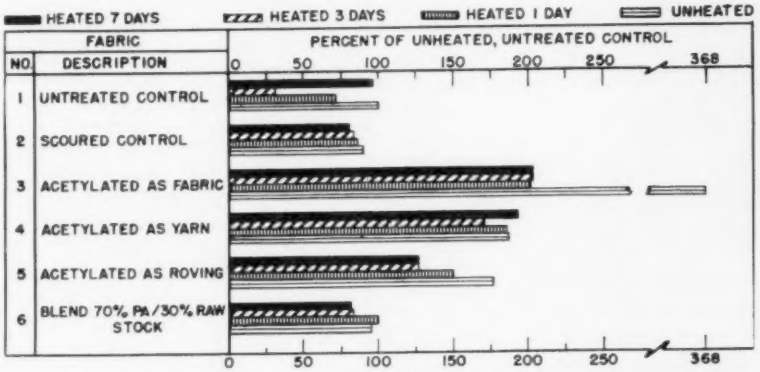

Figure 10. Air permeabilities of the various controls and PA cotton fabrics. These are relative values after the fabrics were heated at 160 C for 0, 1, 3, and 7 days.

Flex Abrasion Resistance. All fabrics were tested for flex abrasion resistance before heating and after three days' and seven days' heating at 160 C. The results obtained were similar to those from tearing strength tests in that the acetylated materials had physical properties that were considerably lower than the grey control before heating, but retained their values much better than the untreated fabrics during heating. Because of the wide variation between the control before and after heating seven days (4114 cycles compared with 9 cycles) the data were not suitable for the type of graphic illustration used in the other figures.

Figure 9 shows data from the flex abrasion tests of the grey control and the PA fabric acetylated as fabric plotted on semi-log paper. Data for the grey control after one day of heating were calculated from previous test results because tests were not made after one day in this series. These data indicate that in any service equivalent to more than one day of heating at 160 C, PA cotton would have greater flex life than grey cotton.

The tests of the other three PA fabrics showed similar results with the yarn and roving acetylated fabrics being almost as good as the fabric acetylated material. The fabric prepared from the blend was slightly better than the other acetylated fabrics before heating, but had less flex abrasion resistance after seven days of heating at 160 C. However, after heating, it was still considerably better than the grey cotton control.

Air Permeability. The relative air permeabilities of the various fabrics are shown in *Figure 10*. The fabric acetylated in fabric form had approximately twice the air permeability of the fabrics made from acetylated yarn and acetylated roving, and almost four times that of the control fabric. Fabrics processed from PA yarn and PA roving were about equal in air permeability, while the fabric made from a blend of PA and untreated stock had air permeability similar to the control.

In general, heating the fabrics had little effect on their air permeability. The PA fabric acetylated as fabric became more resistant to air passage after one day of heating and remained con-

[1]It is recognized that the amount of abrasion per cycle in the Stoll flat abrasion test decreases with each successive cycle due to the wearing of the abradant material, Therefore quantitative comparisons between fabrics should not be made. However, for convenience, a qualitative indication of the relative flat abrasion resistance can be obtained.

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(page 82)

stant thereafter. The cotton control increased in resistance up to three days and then became more open after seven days of heating. These results were checked twice and apparently the cotton is sufficiently degraded after seven days of heating at 160 C to cause opening of the fabric structure. With the exception of the 70 - 30 blend, the PA cotton fabrics had less resistance to the passage of air before heating as well as after the heating periods. This is probably due to the lack of surface fibers on these fabrics that would retard the flow of air.

Over-All Fabric Properties. The prediction of service life from the results of laboratory tests is never completely satisfactory and should only be attempted where the relationship of the particular property tests to service life is known. However, a general indication of durability can be obtained by comparing the over-all retention of all the physical properties after a simulated service life period. *Figure 11* is a graphic illustration of the physical properties of the two control and four PA cotton fabrics before and after heating for seven days at 160 C.

While in most cases the control fabrics had higher values before heating, the acetylated fabrics were markedly superior after heating. The PA fabrics acetylated as fabric and as yarn retained their physical properties slightly better than the PA fabric from acetylated roving. The PA fabric from the 70-30 blend did not retain its physical properties as well as the other three acetylated fabrics. However, an over-all comparison of the physical properties of the control cotton and the 70-30 blend after seven days' heating at 160 C indicates that the 70-30 blend should be considerably more serviceable than the control fabric where heat is an important factor.

Summary and Conclusions. The processing of blends of PA cotton and untreated cotton improves as the amount of untreated cotton in the blend increases, but there is a corresponding reduction in the heat resistance of the product. Blends containing 30% untreated cotton had much less resistance to heat deterioration than PA fabric acetylated in either the yarn or fabric form, but were considered resistant enough for some applications. Blends containing more than 30% untreated cotton had a level of heat resistance that is considered unsatisfactory for most uses.

A comparison of the physical properties of fabrics whose fibers were acetylated after various stages of processing showed that fabric acetylation and yarn acetylation resulted in slightly better fabrics than did roving acetylation and considerably better fabrics than were produced from blended PA stock. However, based on these tests, even this fabric from blended stock had physical properties superior to those of the untreated control after seven days' heating at 160 C.

While various techniques for acetylating stock, roving and yarn have been developed on a laboratory and pilot plant scale, fabric acetylation is still preferable from a commercial standpoint. However, many industrial fabrics are either too tightly woven or too wide for acetylation as piece goods. For these types of fabrics, acetylation in yarn form would be the preferred method of treatment. For a plant interested in acetylation only, such as a chemical company, treatment in the form of roving might be universally applicable for the production of PA yarns and fabrics.

Acknowledgment

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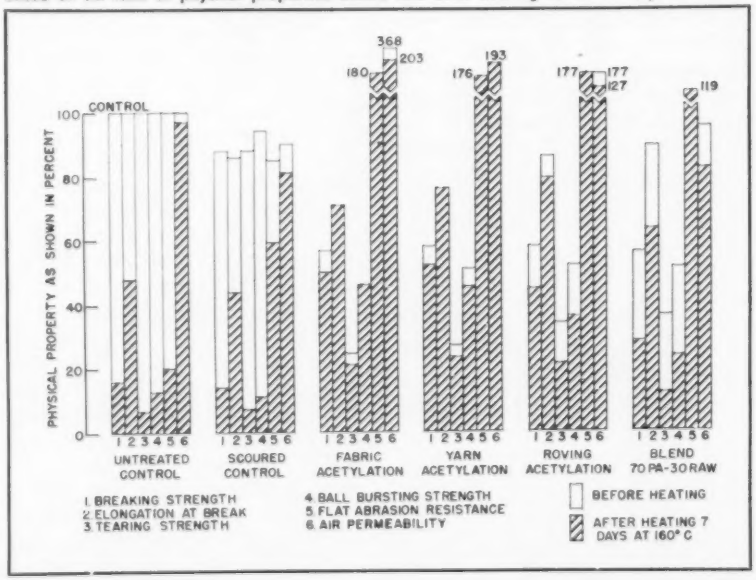
Figure 11. Over-all fabric properties—comparison of controls and PA cotton fabrics, based on six tests of physical properties before and after heating for seven days at 160 C.



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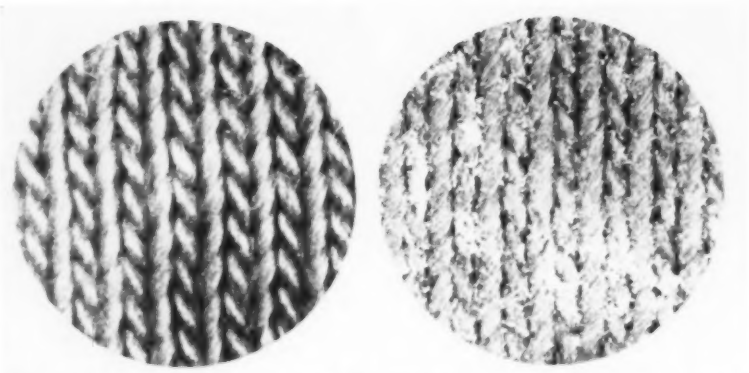
Cold Pad-Batch Method for Cibacrons. Details have been disclosed of a new procedure for applying Cibacron fiber reactive dyes, suitable for large or small batches, involving padding through cold dye liquor containing caustic soda and Glauber's salt, batching while fixation takes place over several hours at room temperature, then washing. Among advantages cited are elimination of need for immediate drying, less danger of migration, good build-up, excellent reproducibility of dyes, and easy washing-off of unfixed color.



Graphic evidence of the value of water softening: Fabric in the photomicrograph at the left was washed in softened water; fabric at the right was washed with the same detergent, but in hard water—calcium and other insoluble soaps have been deposited on the fabric.

Two-Tone Wool in One Bath. Novel system suitable for any stage of wool processing relies on application of reactive dyes under certain conditions to give skittery effects which do not level up on prolonged boiling. Reproducibility is governed by the method and quality of wool or wool blends used. Washfastness is said to be limited in some instances.

Etched Textile Material. A U. S. patent assigned to a German yarn producer covers the introduction of a water-insoluble organic dyestuff in cellulose spinning solution, the dyestuff subsequently being decomposed by a reducing agent to yield an etched effect.

Preshrunk Levis. Replacing the traditional men's Levis, which were characterized by their "guaranteed-to-shrink" fitting properties, the manufacturer is now offering a preshrunk garment. The fabric is being finished by a patented process described as a resin treatment which reduces shrinkage to 0.1%.

New Printing Pastes. U. S. Patent 2,933,403 has been granted, covering a series of textile printing pastes claimed to require no elevated temperatures for preparation, and which can be mixed directly to give the exact viscosity

Continued on page 138

Emulsion Thickeners Up-to-Date

■ SINCE RESIN-BONDED pigments made an appearance more than twenty years ago, their importance in printing cotton fabrics has increased enormously. Their advantages of low cost, ease and economy in application, and good performance (especially in light and medium strengths) still appeal to a cost-conscious industry.

Not the least contributing reason to their success, as everyone knows, is that they utilize emulsion thickening systems, which provide a low-solids vehicle for the resin-pigment combination, leaving the print soft and flexible. It was long ago demonstrated that emulsion thickeners of either w/o or o/w phase can withstand the severe treatments of furnishing and doctoring, and still deposit a color film of desired sharpness and levelness. Such performance has advanced emulsion technology to the extent that emulsion thickeners are now used in quantity for printing vats, stabilized azoics, and fiber reactives. These are the principal dyestuffs (along with aniline black) in use today for printing cotton fabrics.

The need for an improved vat thickener of low solids content and of easy rinsability had been evident for a long time. Although conventional starch thickeners easily meet requirements of printing, they pose two problems which reveal the diminishing function of a thickener after printing: Being of similar carbohydrate structure to cellulose, they possess affinity for the leuco vat during aging, and they require prolonged soaping for the ultimate in brightness and fastness.

WITHIN THE LAST five years, emulsion thickeners of the o/w phase have become commercially available for printing vats. The early problems in developing emulsions stable to electrolytes at high pH have been overcome. The emulsions are also compatible with dyestuffs, much work having been done in dyestuff standardization to promote sound emulsion formulations.

The advantages which these emulsion thickeners offer are worthwhile to review. In paste preparation, they

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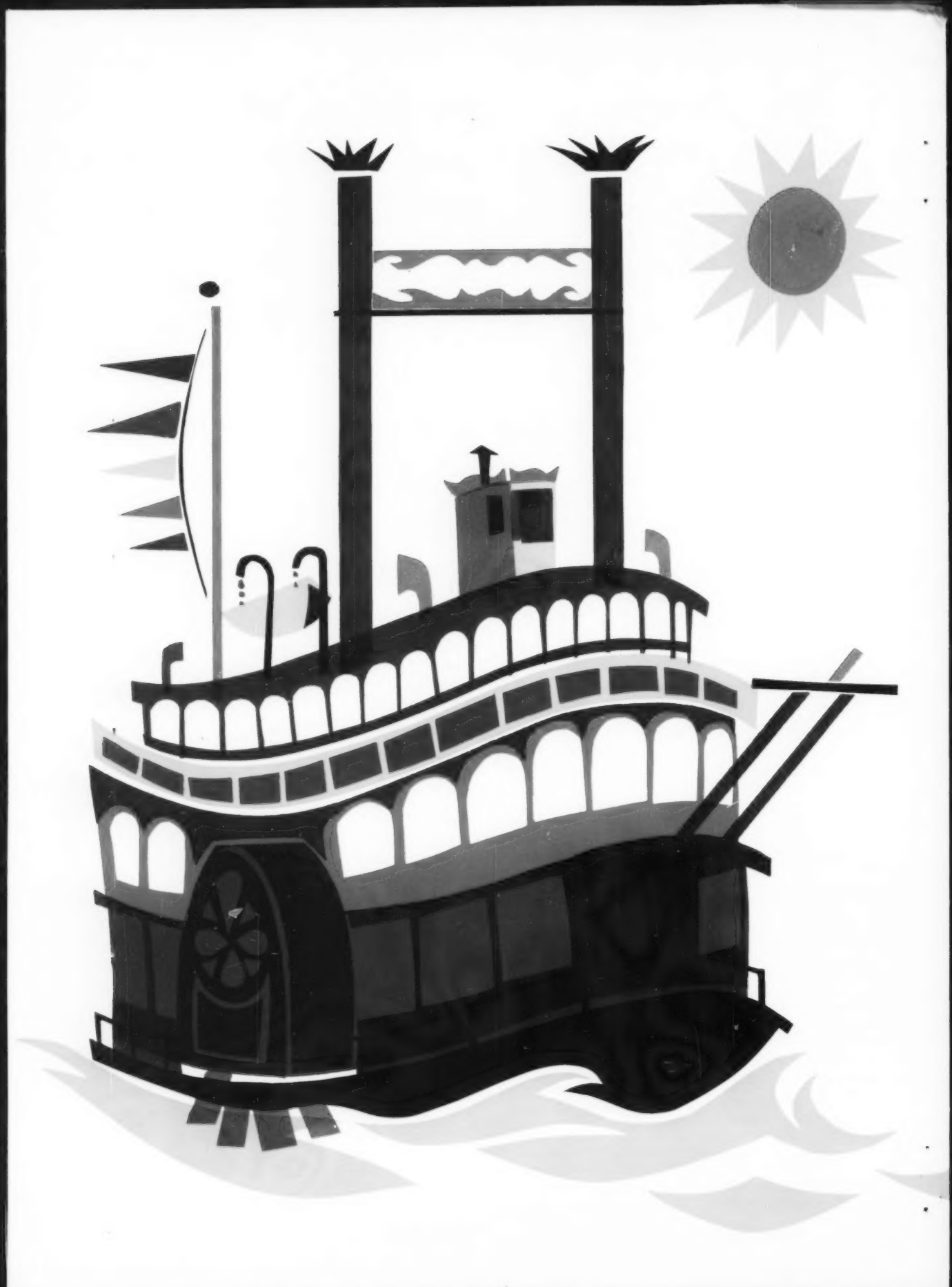

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offer a reduced and simplified routine without the need for heat; while in printing, they offer sharpness of mark, freedom from flushing, and generally a higher color yield. In aging, they facilitate transfer of leuco vat to fiber. And lastly, they require only an open soaping for removal of remaining thickener, which is usually a film-forming agent.

There is a drawback, however, in their application. Before aging, the prints have a tendency to deteriorate on contact with air, resulting in losses of color value and sharpness of outline. The rate of deterioration varies with fabric surfaces, being very much more rapid on fabrics of high texture and pile than on flat fabrics. To overcome this problem, on flat fabrics at least, a strict scheduling of production through the plant is necessary to eliminate a waiting period between printing and aging.

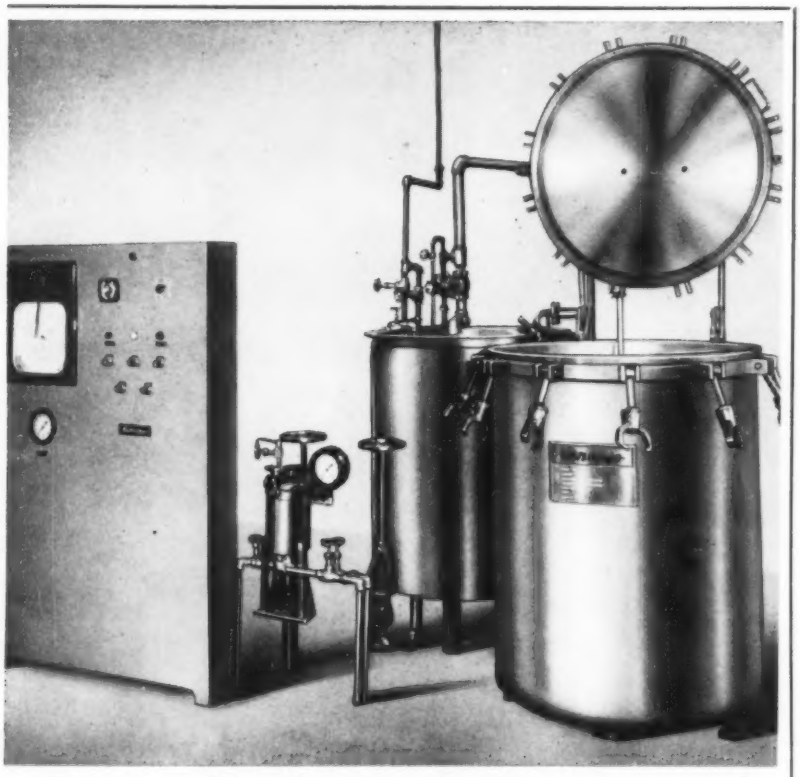
Emulsion thickeners have thus found a particular use where fabric cleanliness of a high degree is essential, as for resin finishing and for the application of water-repellents and stain-resistant finishes. In other instances, as in printing sateens, where a desired high luster favors the use of vats, they meet requirements of fabric cleanliness for finishing and enhance brightness and clarity of shade.

For printing stabilized azoics, suitably formulated emulsion thickeners, also of the o/w class, have become practicable. They meet a stiffer competition, however, since many economical thickener combinations are available. The alginates, for example, either alone or in combination with other thickeners, offer economy and ease of rinsability. For this class of colors, emulsion thickeners must show distinct advantages in running properties, or in producing a superior printed appearance if they are to be considered. One commercial emulsion thickener reportedly showed the following advantages in repeated production runs: increased brightness, sharper mark, improved resistance to crocking, and a higher speed of printing.

FOR PRINTING fiber reactives, emulsion thickeners have found almost immediate acceptance. For that matter, their development was encouraged for this expanding group of colors. The principal advantages of emulsions for this application lie in improved running properties, in better printed appearance, and in higher color yields.

Since the three dyestuff classes discussed here are chemically dissimilar, they obviously require different chemical ingredients for application. Consequently, each dyestuff class calls for an emulsion thickener of special formulation to suit individual chemical characteristics. This would indicate that a knowledge of emulsion technology of some depth is desirable at the plant level; for though the emulsion as a chemical phenomenon is easily understood, under the practical conditions of application emulsions do present problems on occasion. What is indicated for long-run success, along with standardization of color shop routines, is a specific knowledge of the factors that influence emulsion stability in storage and in printing.

The use of emulsion thickeners is particularly beneficial for the application of vats. But their influence in favoring the selection of this color class is not strong, especially in the popular-priced fabric markets where economic pressures exist to keep retail prices from rising. This economic reality places initial color costs as a determining factor in color selection.



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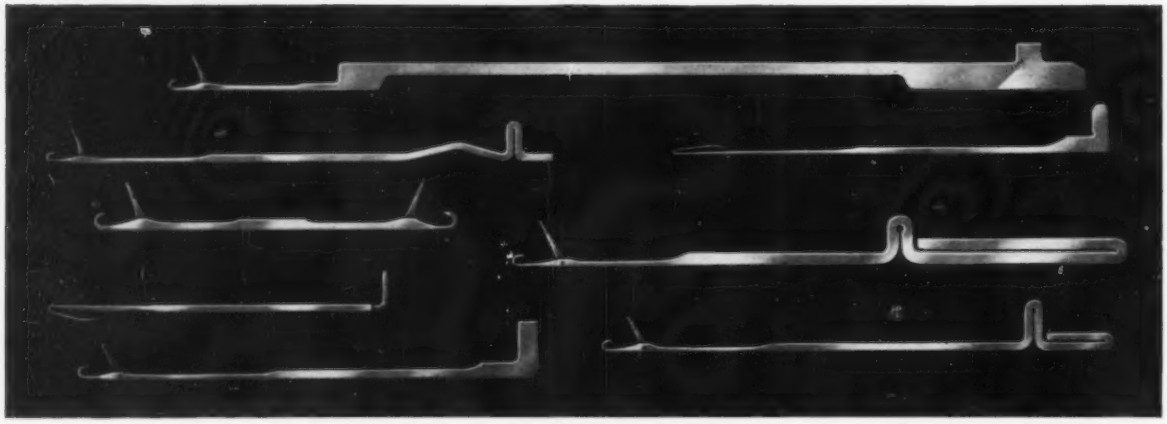

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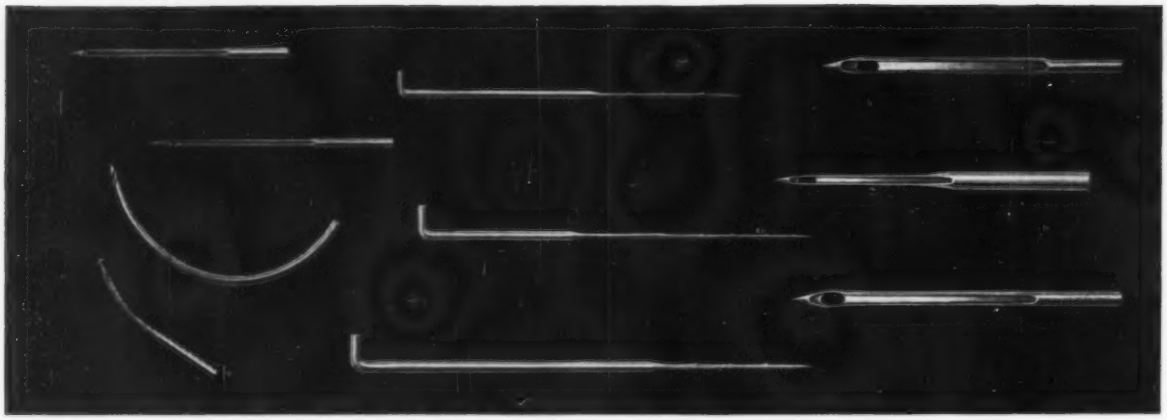

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TORRINGTON MEETS EVERY NEEDLE NEED: SEWING · KNITTING · TUFTING · FELTING

For further information use Handy Return Card, Page 155

KNITTING SECTION

How Runnymede makes socks that sell

Staff prepared Exclusive

Says President Rawls Howard, standing, "Product acceptance is our big gauge for quality." Sitting is Robert Howard, vice-president, in charge of production and general purchasing.

PRODUCT acceptance is the gauge for quality, Rawls Howard, president of Runnymede Mills, Inc., for 37 years, says of sock manufacture.

In business since 1898 (63 years), the mill employs about 200 people and makes misses' and children's socks and a "junior campus" number, a below knee, 7/8-length sock. The best of yarns and constructions go into the products.

Basically staple hosiery makers, the firm uses good quality and innovations to keep sales in an enviable position. One innovation is a knee-length sock with MorPul top that can be worn either over or under the knee.

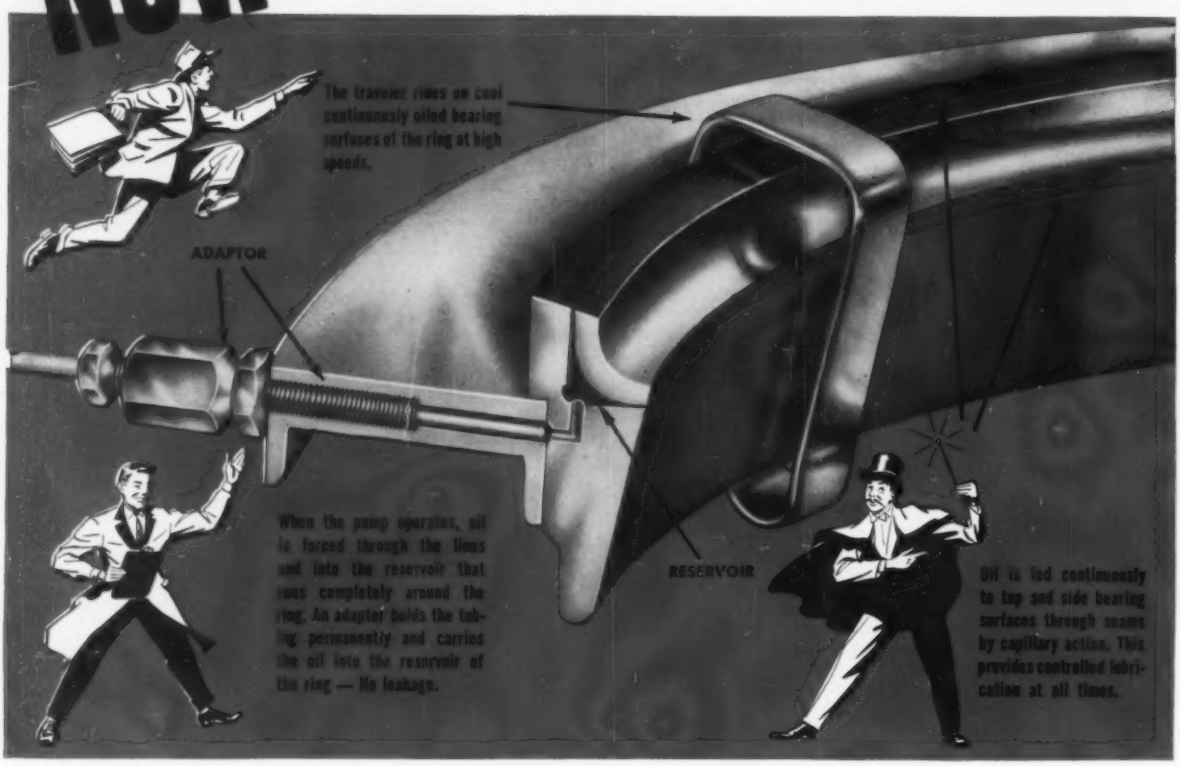
Product development is a continuous process here. For example, development included one style—"campus"—that is made of 18s/2 (64 tex) cotton yarns on a 24-gauge machine. Many mills would use 20s/2 (60 tex) on the same style.

Next, the same sock was made using 47 per cent cotton—30s mercerized yarns (20 tex)—and 53

Quality + Innovation is this manufacturer's

HOSIERY SALES FORMULA

NOW Controlled, Automatic Pressure Lubrication Ideal When Used on "M" Type HERR Conical Rings!


The traveler rides on cool continuously oiled bearing surfaces of the ring at high speeds.
ADAPTOR
When the pump operates, oil is forced through the lines and into the reservoir that runs completely around the ring. An adapter holds the tubing permanently and carries the oil into the reservoir of the ring — No leakage.
RESERVOIR
Oil is fed continuously to top and side bearing surfaces through seams by capillary action. This provides controlled lubrication at all times.

Each stroke of the oil pump piston is timed to provide the minimum amount of oil to lubricate the path of the traveler. No excess or waste!

RESULTS:

1. Cooler operation of Ring and Traveler.
2. Provides longer traveler life.
3. Uniform tension of the yarn at all times due to adequate lubrication of the traveler.
4. Positive assurance of correct oil supply.
5. Faster operation possible.
6. Less ends-down.
7. Oil waste eliminated.
8. No oilcans, no dripping, no overfilling. No labor or supervision required.
9. Keeps costs down.

Always a step ahead, Herr "M" Type Rings are now designed for pressure lubrication from a centralized lubrication system. Oil cups have been eliminated. The oil is introduced through newly designed adapters directly to the annular supply reservoir. (This reservoir runs completely around the ring.) From this reservoir the oil moves continuously by capillary action through the top and side seams. This controlled lubrication assures just the right amount of oil to the traveler. Controlled lubrication because of the special design of Herr "M" Type Rings is entirely self contained. There is no excessive oil, no waste — no overflow of oil to coat other parts of the machine. It is clean lubrication insuring clean yarn without increased maintenance.

Write for complete information.

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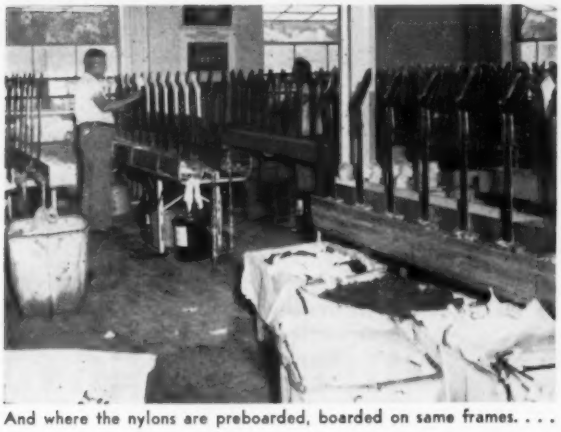
310 FRANKLIN STREET • BUFFALO 2, N. Y.

FOR SPINNING AND TWISTING WORSTED, WOOLEN, RAYON, NYLON, ORLON, FIBERGLASS AND BLENDED YARNS OF ALL TYPES

For further information use Handy Return Card, Page 155

Where the campus socks were developed, are still being made. . . .

And where about 10 per cent of production is hand-transferred. . . .



And where the nylons are preboarded, boarded on same frames. . . .

And some of the socks, knee-length and others, ready for wearers.

per cent stretch nylon in two-ply, 100-d yarns (22 tex). The stretch yarn fulfills market needs and provides comfort and body as well as stretch and strength.

Next came the same style made of 65 per cent wool and 35 per cent stretch nylon and knitted on a 24-gauge, four-inch cylinder machine. The 1/30s (20 tex) worsted yarns were treated to inhibit shrinking; the stretch nylon was in the form of two-ply, 70-d (16 tex) yarn.

Next, the sock was made of wool, Orlon, and nylon. The worsted yarn, of 64s wool and treated to inhibit shrinking, was a blend of 43 per cent wool and 22 per cent Orlon. This was combined with two-ply, 70-d (16 tex) nylon in making up the sock. The progressively higher-price constructions made a complete line of differing specifications to supply the most "fickle" needs.

Some other popular styles include a vat-dyed, 100-per-cent cotton, four-ply, 6 x 3 rib boys' sock made of 36s/2 (32 tex).

A knee-length MorPul is made of 52 per cent mercerized cotton yarn and a 48-per-cent mercerized-cotton-stretch-nylon combination. The 52-per-cent portion is in the form of 36s/2 (32 tex) in the body;

As shoes and socks go together, mill also makes casuals and scuffs, all with textile tops.

and the 48-per-cent part that went into the top contains 20s/2 (60 tex) mercerized cotton and two-ply, 140-d (32 tex) nylon stretch yarn. This style is made on an 84-needle machine.

A 100-per-cent BanLon, knee-length, "junior campus" is made on a 48-gauge unit. Misses cotton (60s or 10 tex) and 53-47 stretch socks are made on 48-gauge machines also. This same number is made with 100-per-cent BanLon too.

Triple-roll bobby socks, hand-transferred, are made with various combinations of fibers and yarns. Hand-transferring is now done on only about 10 per cent of the styles.

Cleaning is done on a continuous basis twice a day. Machines are overhauled at least once a year, at which time needed parts are replaced and thorough cleaning and lubrication are done.

The plant operates five to six days per week, averages 10,000 dozens a week. Styles and sizes include children's sizes 5-11, and misses' sizes 8½-11.

Sometimes, 12,000 dozens a week go through the dyehouse, which is equipped with one 200-pound drum-type dye machine; two 100-pound machines; two 50-pound machines, one 25-pound machine; and one 10-pound machine. Two extractors are used.

An oil-fired automatic boiler of 100 hp takes care of 33,000 square feet of floor space altogether.

Runnymede Mills, Inc. boasts unusually good labor relations. During the 37 years Rawls Howard has been president, only two persons have been discharged, and the cause for those two separations was dishonesty.

One woman hand transferred for more than 50 years, during which time she transferred more than six million socks. (Incidentally, this woman's sister still works here). Labor turnover amounts to about 1 per cent.

Robert Howard, vice-president, administers production and buys everything but yarn for the mill's operation.

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3139 tricot machines in U. S.; 225 in Canada

The number of tricot knitting machines in the United States in 1959 was 3139—34 less than the total in 1957, according to the "Annual Statistical Survey of the Tricot Knitting Industry" which was recently published by Textile Machine Works. Of this number 296 were classified as simplex machines of 30 gauge and finer and 6 as Milanese machines of 28 gauge; the remainder were regular tricot machines, 2440 of which were 28 gauge, 370—32 gauge and finer, and 27—26 gauge and coarser.

1438 of the machines were located in the South, 779 in Pennsylvania, 677 in New York State, 195 in New Jersey and New England, and 50 in the Middle West and California.

The machines were installed in 92 mills, 21 of which operate more than 50 machines, 30 of which operate from 20 to 50, and 41 of which operate fewer than 20.

For further information use Handy Return Card, Page 155

Want to cut needle consumption?

It's easy. Chart the number issued, correct the causes of abnormal consumption

by R. D. Brackett

Exclusive

NEEDLE consumption on full-fashioned knitting machines in some plants is rigidly controlled, while in others it is taken for granted and ignored. Good management does not ignore excessive needle consumption, especially in the face of current prices. With needles costing upward from $35 per thousand, they can cut seriously into the cost of manufacturing full-fashioned hosiery.

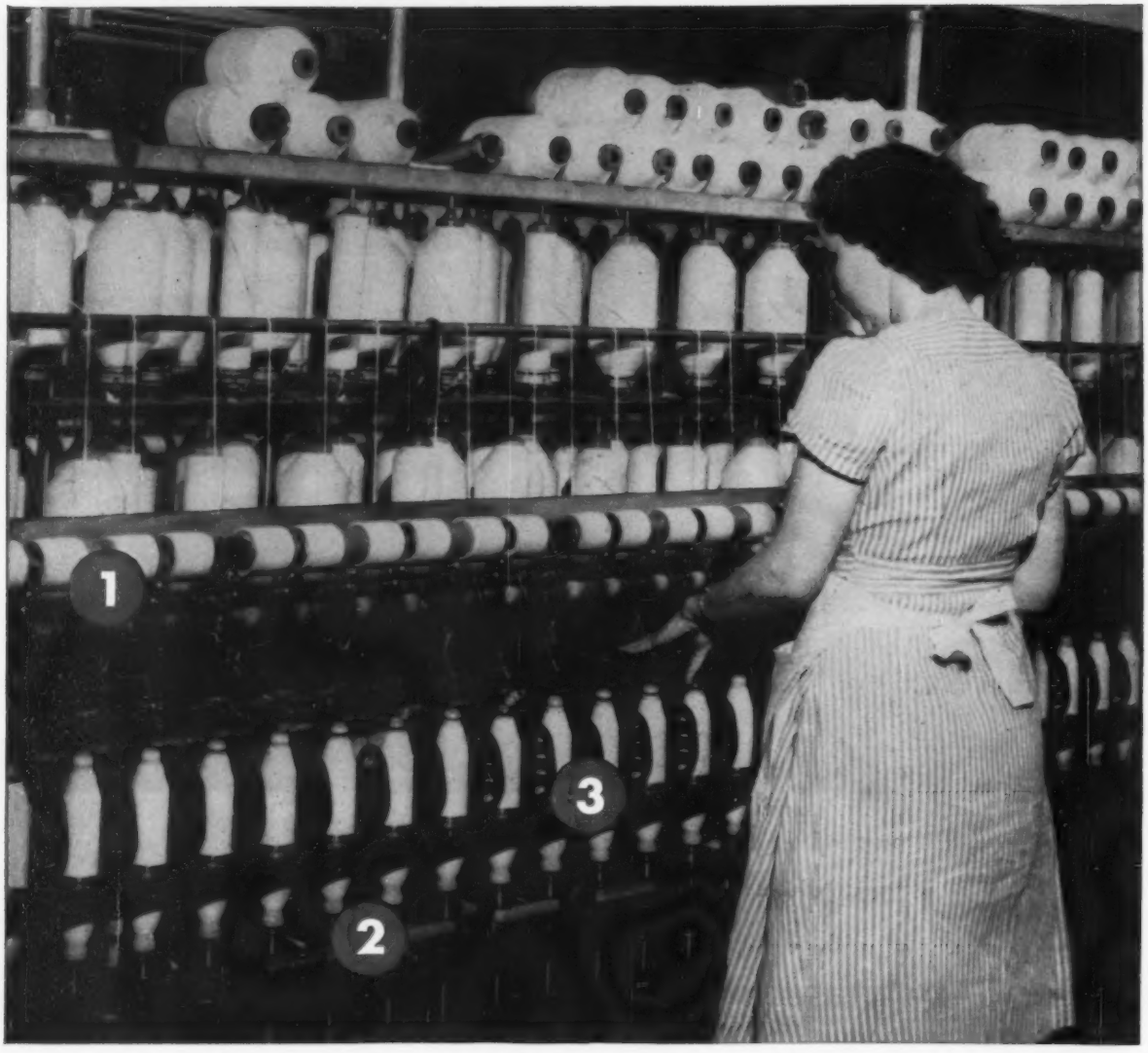
It has been estimated that 75-80 per cent of needle breakage is due to knitters' mistakes—and carelessness. But "to err is human . . ."

NEEDLES ISSUED — WEEK ENDING August 5, 1960

MACHINE NO.	NAME		TOTAL
1	Brown	100	100
	Smith	100	100
	Jones	100 - 100 - 100	300
2	Parker	100 - 100	200
	Ring	100 - 200 - 100	400
	Wibb	100 - 100	200
3	Ray	100	100
	Doane	100	100
	Corley	100	100

It is worthwhile to examine every smash, both major and minor, and try to determine if some device, safety or otherwise, is obtainable or can be worked out. Safety devices are usually available to deal with the most common hazards on full-fashioned machines.

An operator should be instructed properly as to how a friction should be maintained, as improper care of such results in needle breakage, bad selvages, and loss of



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2. SPINESSO® oils are especially formulated to meet the requirements of high-speed spinning and twisting spindles. They resist sludging due to oxidation, assure clean, gum-free operation for long lubrication cycles, and provide instant lubrication during critical start-up periods.

3. TELURA® spindle and twister-ring oils cling to fast-moving parts, resist oxidization and discoloring. Lubricate for long periods without forming sludge or varnish.

NEBULA® EP multi-use grease for textile machine gears and bearings. It requires less make-up, resists the effects of excessive humidity, wet conditions, and high temperatures common to textile equipment bearings.

Your Esso Representative is always ready to help you keep things humming. Give him a call, or write us at 15 West 51st Street, New York 19, New York.

ESSO STANDARD, DIVISION OF
HUMBLE OIL & REFINING COMPANY

For further information use Handy Return Card, Page 155

production. A few minutes devoted daily by each operator to lubricating and maintaining the frictions is well worthwhile.

A record should be kept of each machine and each operator's needle consumption. This, like many other records, will prove revealing and interesting.

Suppose it is found that one operator is drawing from the supply room 500 needles per week while the other two operating the same machine use only 100 needles each. Why? It is possible that all operators on one machine draw 300 to 500 needles per week while other operators on the same type machine draw 100 needles or less.

The answer to this question may vary and each case should be investigated thoroughly. If the machine is at fault, the fixer should be required to fix it. If the operator's method is at fault, it should be called to his attention with instructions to change his method.

As needles are usually issued freely to operators upon request, the operators may be inclined to be careless with them. Where excessive use is indicated, the loss to the company in cost and the loss to the operator in wages should be pointed out and emphasized to him.

An operator should be thoroughly schooled as to cost in wastes, needle consumption, and all other phases of manufacturing over which he has some degree of control.

As stated previously, a record of the number of needles issued to each operator each week is the most effective way of controlling needle consumption. One-half to one needle per dozen stockings knitted is reasonable consumption. Where more needles are used, the amount is excessive, and should be investigated.

The illustration will show the kind of pattern that can be drawn by keeping a record of the needles issued to each individual. Notice that on machine No. 1 one operator was issued 300 needles while the other two were issued only 100 each.

If this occurs week after week, a talk with "Jones" would be in order. On machine No. 2, all three operators were issued an excessive number of needles according to the number issued to machines No. 1 and No. 3. This is an indication of machine trouble and should be investigated.

Check each week's record against the record of the previous week or several weeks. It will show where needles are being used in excess and if the situation has improved or not.

Details in April issue . . . . plus 4 exclusive features on knitgoods manufacturing

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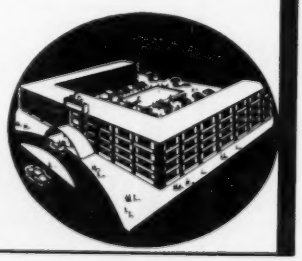

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HOW OTHERS MANAGE

"Why must mills continue paying for this cotton mess?"

THE EDITORS:

As a retired cotton carder I hear many questions voiced by the men still active. And these are the ones I hear most often. The "echoes" are mine.

One asks why we must pay for some twelve to sixteen per cent waste at top cotton prices and again why must the mill pay for some 22.5 to 26 pounds per bale tare. Why so much loss in our cotton? And why does our country sell to our competitors in other countries our home grown cotton at some 8¢ per pound less than we must pay.

He asks why our colleges have not done as much for cotton as they have for plants, livestock, and poultry.

We have only some eleven grades of our longest and strongest cotton, and thus the waste combed out of it is high indeed. And we do have some eighteen grades of our upland cotton from the shortest to the longest.

One can find in most all bolls of any cotton fibers ranging from ⅛" to the limit of the staple. And we must get much help from such schools for a longer, cleaner, and stronger cotton.

And we must raise our production some 20 per cent during the 1960's and 1970's. And this is a must or we will turn our markets into a happy hunting ground for other countries' markets.

One could say "why the rush?"

By the end of the above dates we shall have some two hundred to two hundred-ten million people to furnish with textiles. These must be furnished with a better quality than today's.

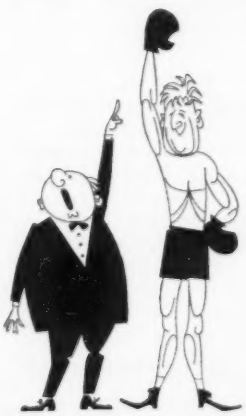
Now back to the cotton—no producer seems to pride himself on a good, clean sample. He doesn't take care of the cotton as he did before, leaving it out in all kinds of weather, etc.

Considering the shape the cotton is in when it arrives at the gin, I feel the gin does a very good job. But the gin must take out more of the refuse we cannot put into yarns and piece goods.

Mills must pay for the trash in the cotton at cotton prices, and pay the same rate for the patches added and the extra band on each bale. And mills must pay for the false-packed bales—it is a mill loss on every hand.

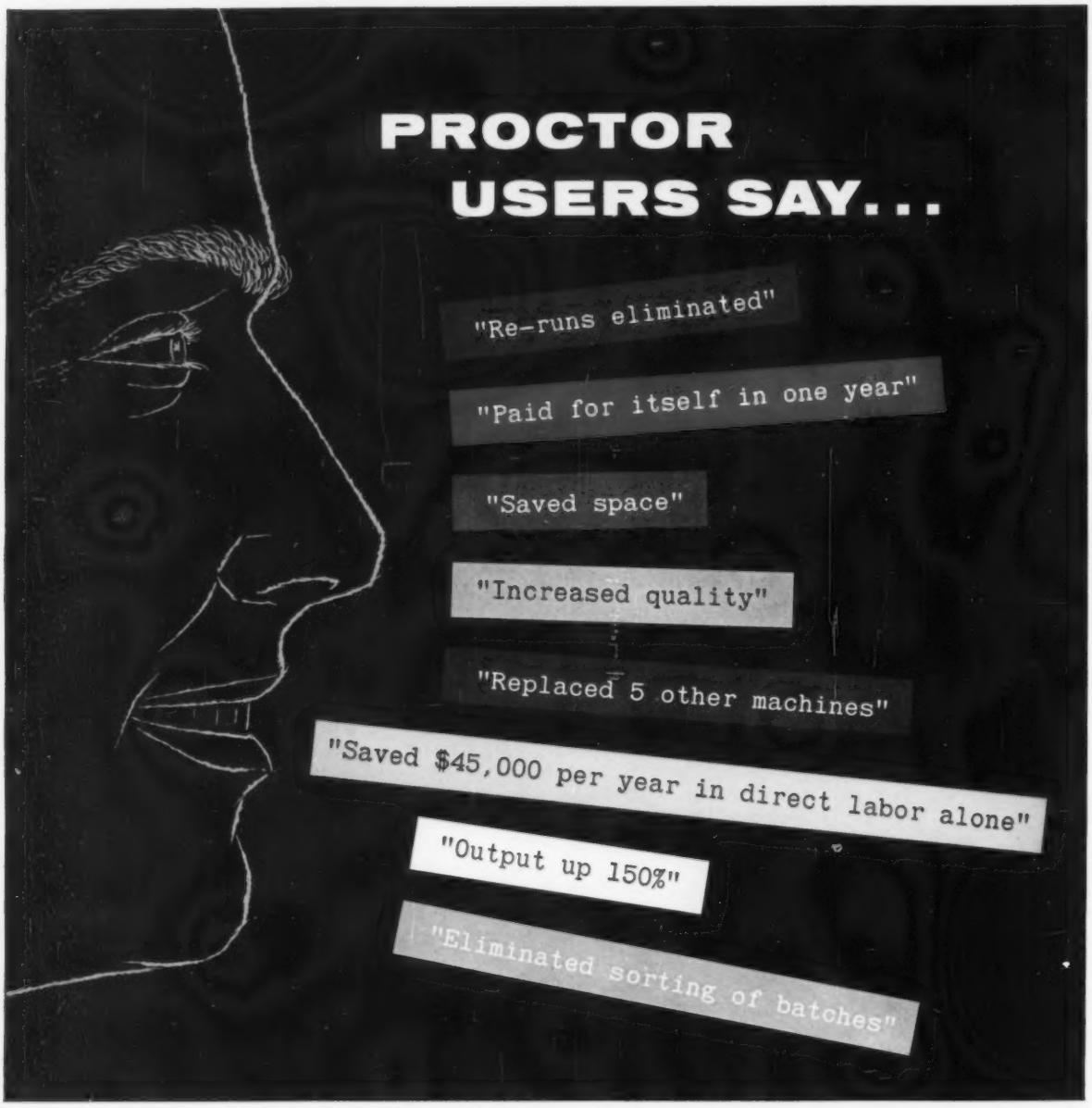
The cost of handling our waste alone runs into big money, and having to compete with other

The Winnah!



. . . C.N.H. Remick, of Glenco, Ontario, Canada, won the kink contest that ended December 15, 1960. The judges gave him the prize for his ingenuity in developing the yarn loft meter on page 136.
See page 137 for the rules of the contest now under way.

Mr. Remick



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countries using our own cotton and at lower wages than we have is downright wrong.

We have stores that import textiles, and we have a surplus of textiles in our warehouses! We are giving our people a good wage and these same people are the store's only customers—no one comes from these other countries to purchase the goods stored in surplus.

These same stores know that if all our people and all our industries do well, then the stores share in the prosperity—just close any one plant and see how many stores suffer!

Some of our chain stores, as a sort of gag, have trained their salesmen that a mere whisper "imported" in a prospective customer's ear is enough to clinch a textile sale. Until recent years our mills wanted to produce by the car load while the other countries produced by the yard, the other countries keeping quality high.

Sure, our people want the best, and they have been told so many times our best textiles come from abroad. I do not agree to this—just name it and our mills can produce both in the quality and the quantity our customers like. But we are still paying for our folly of past years.

Today as our people become more and better trained, fewer of them go to bargain basements for their needs. There is something about quality that is afraid of steps and elevators that go downward.

We should have a choice in the kind of covering used on our cotton bales, how much that cover should weigh, and the number and weight of bands on each bale. We pay regular cotton prices, as I have mentioned before, for all such wrappings. And the buyer must handle and sell these at about $3.50 per bundle—one bundle representing the bagging and bands from one bale.

If we can make a lady's dress out of six to eight ounces of goods, surely we can cover a cotton bale with less than twenty-six to thirty pounds of wrapping!

I suspect that the five bands on the cover should not exceed ten pounds. I also suspect that the gin could remove from five to six per cent more of the refuse than it now does. These savings in wrapping and refuse would then amount to twenty-three to twenty-four pounds per bale.

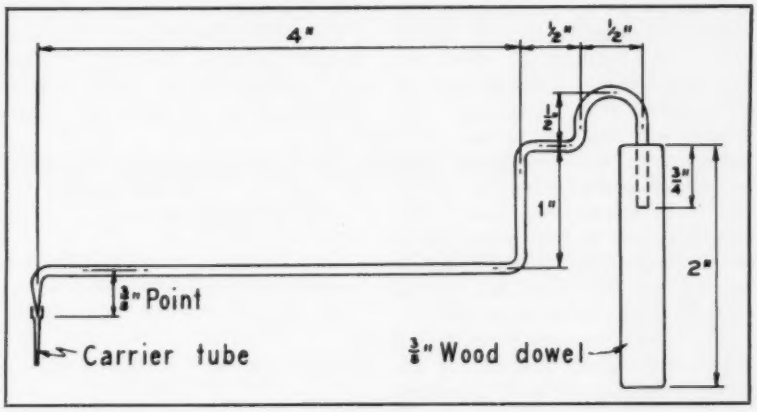
I also believe that the seller's warehouse should be big enough to hold all his cotton—the same goes for the buyer of course—to avoid weather damage, and it should be clean enough to avoid contaminating packages.

CONTRIBUTOR No. 1295

Easy, quick way to remove carrier tubes

THE EDITORS:

When the carrier tubes on full-fashioned hosiery machines have been in use for a couple of months, they must be replaced. I devised this method of removing them to replace the slower way requiring the butt of an old needle.



I cut an 8" section from a discarded yarn guide, ground one end to a point that will fit into the carrier tube, then bent the guide into a right angle about ⅜" from this sharpened tip. I made further bends as shown in the illustration. Then I fashioned a handle from a 2" length of pencil-size dowel rod, drilled it to receive the end of the guide, and drove the wire in to tighten it.

The bends allow a measure of pressure to be applied while I tug slightly. This combination of forces I assist with a little push against the bottom of the tube with needle pliers. The system is not only easier than the old one, it is faster.

CONTRIBUTOR No. 1286

Properly applied fiber additives don't load

THE EDITORS:

In your staff-prepared article of June 1960, p. 71, on fiber additives, you report on the mixed results by different mills applying colloidal silica on cotton of the same grade and staple and also the problem of loading. Such experiences are clear evidences of improper spraying.

You report mills spraying solutions at the rate of 1.5 to 2.0 per cent on the weight of the fiber. Our experience has shown that such spray rates are entirely too great, even for cottons of below normal moisture content.

Our recommendations for cotton always lie below 1 per cent, most usually 2/3 per cent of a solution made by cutting our product 3 to 1 with water. Added moisture contents above 1 per cent, especially when applied in a non-uniform manner as is the case so often with ill designed spray sys-

tems, does lead to problems of nonuniform laps, loading of cards, and lapping in drawing and spinning.

Proper rate of spraying with good uniform coverage of the right strength solution must be employed to reap the advantages of fewer broken fibers, less fly, less static, better spinning efficiency, and stronger yarns without incurring the disadvantages of loading in condensers, cards, etc., lapping in drawing and spinning, and excessive cleaning.

Summarizing, we claim better spinning and better yarns will result by the use of fiber additives on cotton. But we add that such results are always dependent upon the uniform application of the right chemical solution in an amount less than one per cent on the weight of the fiber.

WILLIAM F. LUTHER
President, Lutex Corp.

Yarn loft meter helps with hosiery quality

THE EDITORS:

During a recent campaign to improve the quality of our men's hosiery, we brought our yarns under close scrutiny. Immediately we discovered that, although the weight per unit length was consistent with the count, the loft, or volume per unit length, varied visibly in some cases. Our problem then was to find some method of quickly and easily measuring the loft. Our suppliers told us that no such method existed.

The simple apparatus illustrated here finally grew out of our efforts. It consists of a ¾" plywood base, a steel-rod frame, a push rod, a laboratory graduate cut to a convenient height, and a sliding weight. In use, we wind a 100-yard sample of the yarn into a skein and tuck it into the graduate.

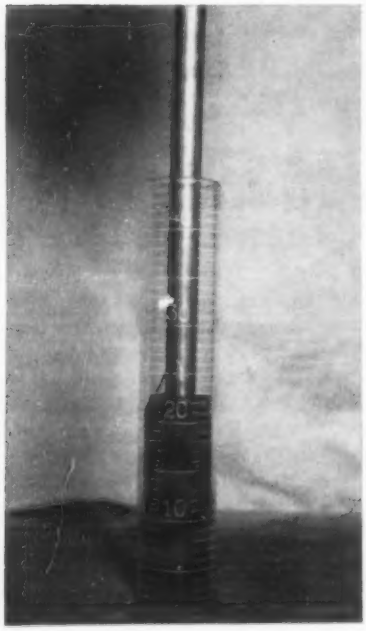
Now, this yarn can be compressed into a certain volume by a certain weight, depending on the loft of the yarn, and this is where the sliding weight and push rod come into play.

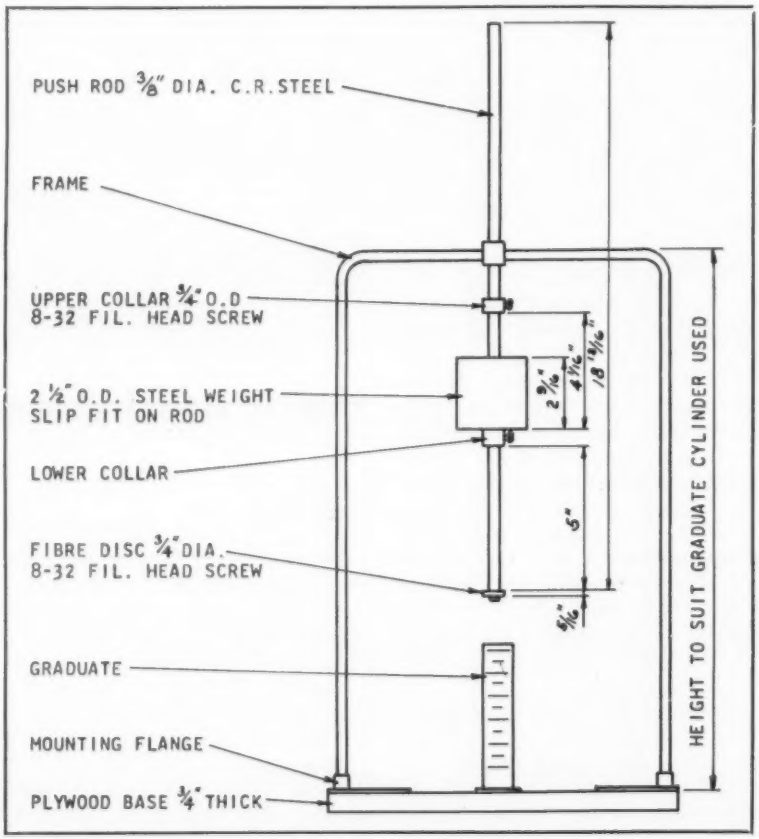
To operate the meter, fit the fiber disk into the graduated cylinder holding the yarn sample, raise the weight to the top collar on the push rod, and drop it. Do this only *once* per sample. This action tamps each sample in exactly the same manner and adds its measure of reliability. Now, raise the weight just enough to free it from the bottom collar, wait for the yarn to stop expanding, and record the position (the milliliter mark) of the fiber disk inside the cylinder.

The figure so obtained is an arbitrary loft measurement that we find quite reliable—27 milliliters become 27 loft per 100 yards of yarn, etc.

To date, two spinning companies have had the meter duplicated for their use, and we definitely experience a new uniformity in the yarns we knit. So, we feel it is practical enough.

C. N. H. REMICK





Compare this system of loom cleaning with your own

THE EDITORS:

Recently, upon coming to my present job as second hand, I noticed immediately that looms were being cleaned without an adequate schedule. The method used was simply to let the operators blow off as far as they could go each shift and then to let the succeeding shift take over at that point. The looms were not in too bad condition, but it was obvious that they were not being cleaned under schedule.

I began to discuss with our overseer various systems of cleaning, and we tried several methods. These helped, but we still did not get the quality of cleaning we desired.

We have what we call the "old" shop and the "new" shop separated by a spare floor, and our looms are about equally divided between them. We decided to let the loom cleaners in the new shop work from the east end of the shop to the spare floor, cleaning 90 looms per shift.

Our greatest problem was in the old shop where we have 15 lines of looms with 12 looms per line. We decided to give each shift 72 looms or six lines. I began to keep a chart of each shift, and occasionally I would show it to the men. They began to have more pride in their work, and we are systematically getting a better cleaning job.

The squares in the accompanying sketch are numbered 1, 2, and 3, corresponding to shift assignment. The column of numbers down the left side indicates the line number, and each horizontal column represents 12 looms (two per square). In the plant we enter the shift assignments in color.

Although this is a fairly simple method of cleaning, I feel that it will benefit others to some extent, and I should like to hear from others with similar problems and to discuss methods with them.

CONTRIBUTOR No. 1292

	M	T	W	T	F	S
1	3/2	2	1	1	3	3/2
2	3/2	2	1	1	3	3/2
3	3/2	2	1	1	3	3/2
4	3	3/2	2	1	1	3
5	3	3/2	2	1	1	3
6	3	3/2	2	1	1	3
7	1	3	3/2	2	1	1
8	1	3	3/2	2	1	1
9	1	3	3/2	2	1	1
10	1	1	3	3/2	2	1
11	1	1	3	3/2	2	1
12	1	1	3	3/2	2	1
13	2	1	1	3	3/2	2
14	2	1	1	3	3/2	2
15	2	1	1	3	3/2	2

How to read this chart. Each square represents 12 looms. On line one, the first box under Monday (M) reads 3/2. This means that on midnight Sunday, the third shift starts the week by cleaning lines 1 through 6. The first shift takes over and cleans lines 7 through 12. Then the second shift cleans lines 13 through 15 and doubles back on lines 1 through 3. The third shift (Tuesday) then cleans lines 4 through 9; the first shift, lines 10 through 15; and the second shift gets lines 1 through 6.

Primer coat can cut cleaning costs

THE EDITORS:

A little more time taken in finishing metal to be exposed to mill atmosphere can save much of the cleaning difficulties associated with poorly finished work. Each time the shop turns out a bit of metal work and leaves the surface full of pores, mill marks, etc., the object requires more than its share of cleaning time.

A heavy priming coat, of the type used in automotive finishing, sprayed on and sanded absolutely smooth, will permit a mirror-like enamel finish to be sprayed on. Such a finish lasts longer, too.

CONTRIBUTOR No. 1297

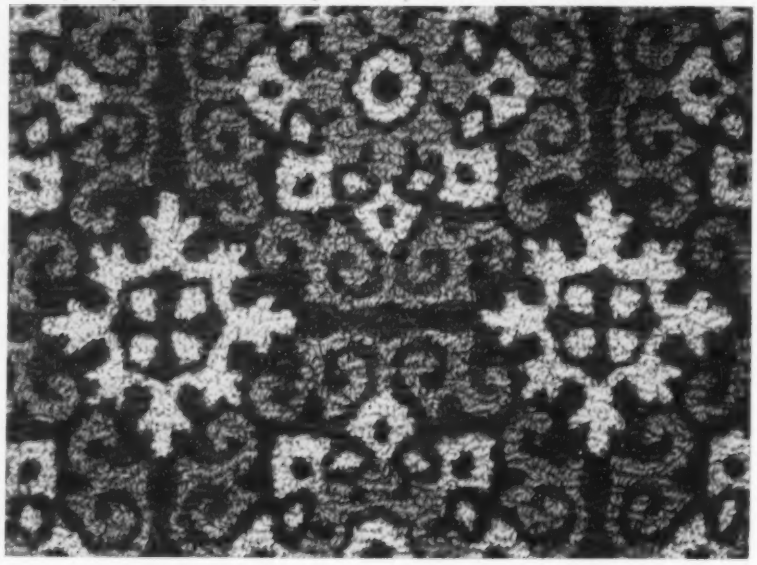
Win TI's kink contest

Every kink, short-cut, time-saver, or quality improvement suggestion entered in the contest will be paid for at current space rates immediately upon acceptance, and the $100 award will be made to the winner as soon as all entries are judged.

The contest rules are simple:

- All contributions must be postmarked not later than midnight, April 15, 1961.
- No limit to the number of entries an individual may submit in any one contest.
- All entries paid for upon acceptance — no waiting. Extra payment for photographs that are usable. Extra consideration is also given kinks accompanied by legible pencil sketches or drawings.
- Entries must not have been published previously and must not be submitted to any other publication.
- Send your contest entry to: The Editors, TEXTILE INDUSTRIES, 806 Peachtree St., N. E., Atlanta 8, Georgia.

The patterns in these two rugs were produced in a single operation by the recently announced "Tuft-Dyed" process of Bigelow-Sanford, Inc. In the new method, multicolored pattern is applied to undyed carpet by a precision forcing of the tufts into the shaped dye-wells of a pattern mold. Deep-penetrating dyes, regulated by control pumps, impregnate the tufts to the depth of the carpet's pile. It is claimed that the method is capable of creating a multicolored pattern with great clarity and definition at low cost.



Wet processing news

(from page 118)

desired in the particular pigment or dye mix. Incorporating a new type of dextran bodying agent that does not form "legs" as do the long, stringy or plastic gums, the new printing pastes are said to be capable of producing sharp designs of even intricate, closely spaced, multicolored lines without running or smudging. The pastes are also reported to be very satisfactory for resist printing.

Crosslinking and De-Crosslinking. Suggestions for improved resin finishing are contained in a recent report by the Southern Utilization Research and Development Division, USDA. The report has particular reference to compounds of the N-methylol type used in crosslinking cotton cellulose; a serious weakness of these compounds is a tendency for a reversal of the crosslinking reaction to take place in storage or laundering. It is suggested that this weakness can be minimized by a thorough wash after curing, to remove the catalyst, and storage in a cool, dry atmosphere. A thorough cure to drive the reaction to completion will reduce the initial chlorine retention which is characteristic of the compounds.

New Dyes and Chemicals

Carrier for Polyesters. "Thermoprint" is a new carrier for printing on polyester-fiber fabrics where the Thermosol method is used for development of the print. Reportedly, fabrics on which the carrier is used will show brilliance and sharpness of mark after treatment at a minimum of 300 F for five minutes. It is also suitable for steaming and aging methods, and is supplied by The Harshaw Chemical Co. in the form of a free-flowing white paste to be added by volume directly to the print paste. *(M-1)*

Vat Stripping Assistant. Latest addition to the Algepon group of stripping auxiliaries manufactured by Arkansas Co., Inc., is Algepon XR, said to represent a breakthrough in efficiency that extends to vat dyes of the anthraquinone type, heretofore difficult to discharge to a satisfactory ground. Use of the compound involves only addition to a conventional hydrosulfite and caustic bath. *(M-5)*

Dyes for Synthetics. Five new dyes for synthetic textiles were recently introduced by Eastman Chemical Products, Inc.—four for polyesters and one for acrylics. Polyester Brilliant Red FFBL, a blue shade of red, is the brightest red in Eastman's line of dyes for polyesters. Polyester Dark Brown GL was developed particularly for men's wear. Polyester Brown 3RL is a strong orange shade of brown which stains wool to a lesser degree than do most orange dyes. Polyester Navy Blue RL is claimed to provide exceptionally good color value in obtaining full, bright shades of navy blue. Eastacryl Blue 5GL, a cationic dye for acrylic fibers, provides the means of achieving brilliant green shades of blue which do not flare red under artificial light. *(M-6)*

Resin for Printing, Nonwovens. Low crocking, improved wastfastness, freedom from discoloration, and superior resistance to cyclic aging are features claimed for

Rhoplex B-27, acrylic polymer developed by Rohm & Haas Co. for roller and screen printing and for bonding nonwoven fabrics. Supplied as a nonionic emulsion of 45% active ingredient, it may be used in printing with either o/w or w/o systems; and offers excellent fastness properties for nonwovens, with stability to heat and ultraviolet exposure. *(M-7)*

Direct Blue. Cuprofix Blue C-FBL is a new aftercoppering direct dye, recommended by Sandoz, Inc., for all types of cotton or rayon materials where exceptional fastness to light and washing are desired. It is said to exceed the other Cuprofix blues in brightness and clarity of shade. *(M-8)*

Leveling Agent for Wool. A leveling agent for wool dyeing, called Lyogen WD, is available from Sandoz, Inc. It is recommended for use with acid dyes—particularly milling dyes—and with chrome dyes. Milling and Lanasyn Brilliant dyes, normally applied from a neutral bath, can be dyed level in acetic or phosphoric acid using this agent. *(M-9)*

Cement Plastic to Fabric. Plastix wet stick and Plastix heat seal adhesives are latex polymers easily applied by roller, spray, or brush in bonding unsupported plastic to cotton and other materials. According to Adhesive Products Corp., they dry rapidly to tack-free surfaces that usually do not discolor materials. The wet stick is excellent for flocking on vinyl and other plastics; heat seal is recommended for attaching appliques to fabrics, handbags, etc. *(M-10)*

High-Yield Print Thickeners. A series of low-cost print gum thickeners now being marketed by Morningstar-Paisley, Inc., feature high color yield and ease of washout. They consist of high-viscosity products that can be used with Rapidogens, vats, Indigosols, and direct dyes. Called Startex, they are applicable to all types of fabrics by standard screen and roller printing processes. *(M-11)*

◆ *For more data on any of these dyes and chemicals, write supplier or use postage-free card on page 155, listing in space provided the code (M-1, M-2, etc.) in parentheses at end of descriptions.—The Editors.*

Tufted textile outlook is good

by R. E. Hamilton
Executive vice-president
Tufted Textile Manufacturers Association

■ TUFTERS look for, and have prepared for, a good spring season in 1961.

Tufted Floorcoverings

1961 shipments of tufted floorcoverings—rugs and carpets—should be at least 150 to 160 million sq yd and dollar value 425 to 450 millions (they totaled 133 million sq yd in 1959). With any improvement in the national economy, tufting shipments might well be considerably higher.

Fiber Prospects

Rayon. While rayon has dropped from its peak of 104 million pounds in 1957, in the first half of 1960 it still was the number one fiber in tufted floorcoverings, with 36.9 million pounds being used in rugs and carpets. The decline will continue, but rayon and rayon-nylon blends will remain among the important fibers used in tufting.

Wool. As a pile fiber in carpets, wool usage has increased very rapidly in the past five years; 1956—6.8 million pounds, 1957—14.7, 1958—23.8, 1959—42.7, and in the first half of 1960, 27 million pounds, ranking second to rayon. Practically all the wool went into carpets, while rayon is used extensively in small rugs as well as in carpets.

Wool usage will continue to go up in 1961, but with the rate of increase slowing.

Cotton. Cotton as a pile yarn in tufted floorcoverings actually increased in poundage in 1957, 1958, and 1959, and held its own in the first half of 1960. It is an excellent fiber for small rugs and also long has been popular in room-size rugs and carpeting. An important share of total volume for a number of mills comes from cotton pile rugs and carpets.

Cotton again in 1961 will be among the leading pile fibers.

Nylon. Bulked filament nylon has been the "hot" fiber in 1960. Tufters have used every pound they could buy. This condition should continue in 1961.

Total nylon usage has been estimated at 30 million pounds for 1960. For 1961 the total will be affected by the available supply of bulked filament.

Heat-set nylon should not be seriously affected by bulked filament in 1961. It is used in staple twist numbers and they should continue to sell.

A considerable amount of nylon staple (virgin, garnetted, and "producers' waste") goes into blends and low-priced rugs and carpets. In spite of the popularity of bulked filament nylon, we see no great decrease in the usage of nylon staple in 1961.

Nylon, with bulked filament getting the headlines, should improve its position as a floorcovering fiber in the next few years.

Acrylics. Acrylic and modacrylic fibers have made their way into more and more carpet lines. Licensing programs of the fiber producers probably have sacrificed quick sales in the interest of long-term sound growth. National advertising and promotion have had an effect at the consumer level. Gradually increasing usage is anticipated.

The fiber picture as presented above is based on an expected increase of sales during the next few years to a total of 200 million sq yd.

Bedspreads

The year 1959 was the best, dollarwise, in the history of the tufted bedspread industry. Spring 1960 likewise was the biggest first-half on record. The fall season has been reasonably good. No radical changes are foreseen during 1961.

NEW PRODUCT PARADE

Please note: Claims made in all of these announcements of new developments are of necessity based upon information furnished by the respective suppliers.—The Editors.

Optical feeler for looms cuts reserve filling level

A photoelectric bobbin feeler for installation on new or existing looms features single lens reflex design which permits gross misalignments to be tolerated, eliminating the necessity for precise focusing and adjustment. With the light source and receiver located in one housing and a single lens serving for both exit and re-entry of the light beam, insensitivity of the fully transistorized unit from shock, vibration, and stray light are insured and mounting is simplified.

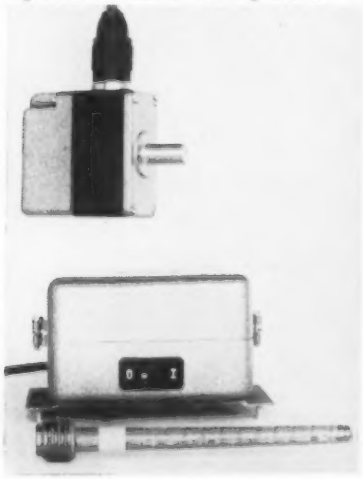
Designated the Model SF 1 Bobbin Feeler, it consists of two parts: the optical head and amplifier control box. Controls may therefore be located anywhere desired without regard for shielding or length of cable. Output signal is clear and unambiguous, even when highly reflective yarns (such as filament nylon) are employed. Because of the sensitivity of the feeler, the bobbin reserve can be smaller than when employing electro-mechanical sensors. Since the feeler does not touch the filling, there is no danger of damaging it; also, with no problem of wear, settings do not have to be changed once they are made.

Light from the lamp bounces off a half-silvered mirror and is projected through the single lens onto a reflective material that is taped on the bobbin. Reflected light is returned in parallel lines to the optical head (through the same lens, through the mirror, to the photodiode).

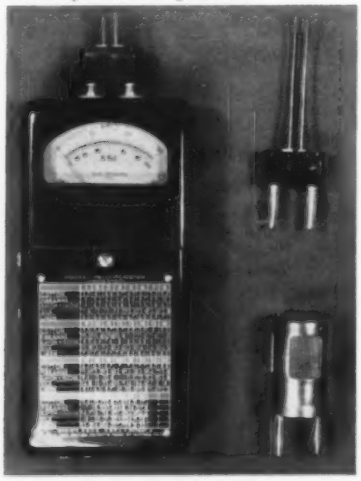
Presin Co., 2014 Broadway, Santa Monica, Calif.

Do you want more data? Write supplier or use postage-free card on page 155; list C-101

Components of the Presin photoelectric filling feeler for new or existing looms.



The Hunter Pocket Psychrometer and three of the special sensing devices.



Pocket psychrometer measures moisture in fiber, yarn, fabric

A transistorized, battery-powered pocket model of the Hunter Psychrometer, which utilizes the Eicken System for precise, instantaneous moisture detection, now is available. The Hunter Pocket Psychrometer, only a little larger than a pack of king-size cigarettes, provides a quick, accurate method for determining the moisture content of raw fibers, yarns in skeins, cops and a variety of packages, and fabrics.

The versatility of the instrument results from the development of a variety of special sensing devices, which are connected by a simple plug-in attachment to adapt it to the particular material being processed.

Two types are offered: One contains special circuitry for measuring moisture in cotton, rayon, and other cellulosic fibers, as well as polyester and acrylic synthetics. The other is for use with wool and nylon and similar synthetics. A special measuring element which determines relative room air humidity also is available.

James Hunter, Inc., Mauldin, S. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-102

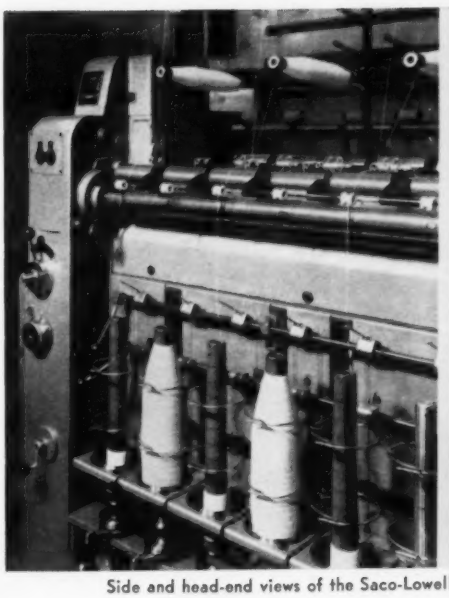
Twister offers better control of twist without elongation

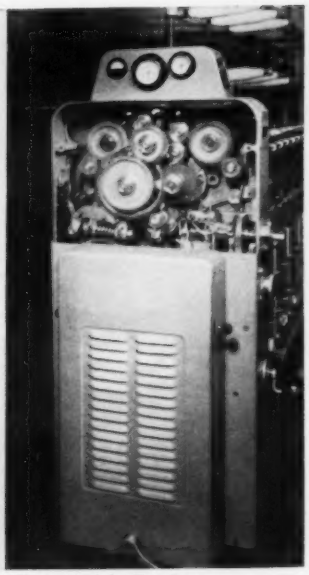
A 24"-wide high speed ring twister, the Saco-Lowell Allma Model AZ, provides better control of twist without elongation and operates quietly without vibration. Among construction features of the machine are these: (1) antifriction bearings throughout; (2) automatic lubrication; (3) built-in instruments give

cylinder and front roll speeds; (4) drive in head end; (5) stop motion acts instantaneously; (6) lay is adjusted by simply turning a dial; (7) low and easy to creel; (8) reversal of twist is easily and quickly accomplished; (9) two node rings; (10) traverse up to 16".

Saco - Lowell Textile Machinery Div., Saco-Lowell Shops, Easley, S. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-103





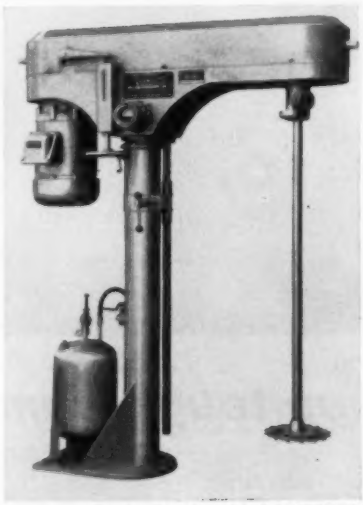
Side and head-end views of the Saco-Lowell Allma Model AZ twister.

Wet processing plant mixer for 50- to 200-gal batches

Specially designed and engineered for low to medium volume production requirements is a new Cowles Dissolver, Super Series Model 515-VHV. Applicable to a wide variety of products, the machine is a high speed, high shear, impeller-type unit. It is capable of mixing, dispersing, deagglomerating, etc., materials up to 50,000 centipoises or more.

Morehouse Cowles, Inc., 1150 San Fernando Rd., Los Angeles 65, Calif.

Do you want more data? Write supplier or use postage-free card on page 155; list C-104



Morehouse Cowles Dissolver, Model 515-VHV.

Light fastness tester approaches sunlight

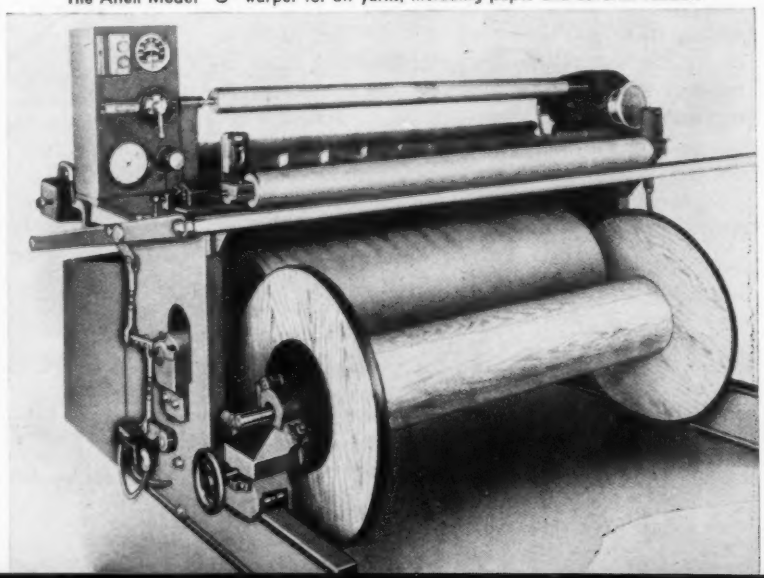
A new line of Fade-Ometers and Weather-Ometers provides spectral energy distribution very close to that of natural sunlight. The lamp employed in the machines is a 6000-watt, water-cooled xenon lamp which has sufficient intensity to permit simultaneous exposure of 54 specimens 3" x 9" in size.

Atlas Electric Devices Co., 4114 N. Ravenswood Ave., Chicago 13, Ill.

Do you want more data? Write supplier or use postage-free card on page 155; list C-105

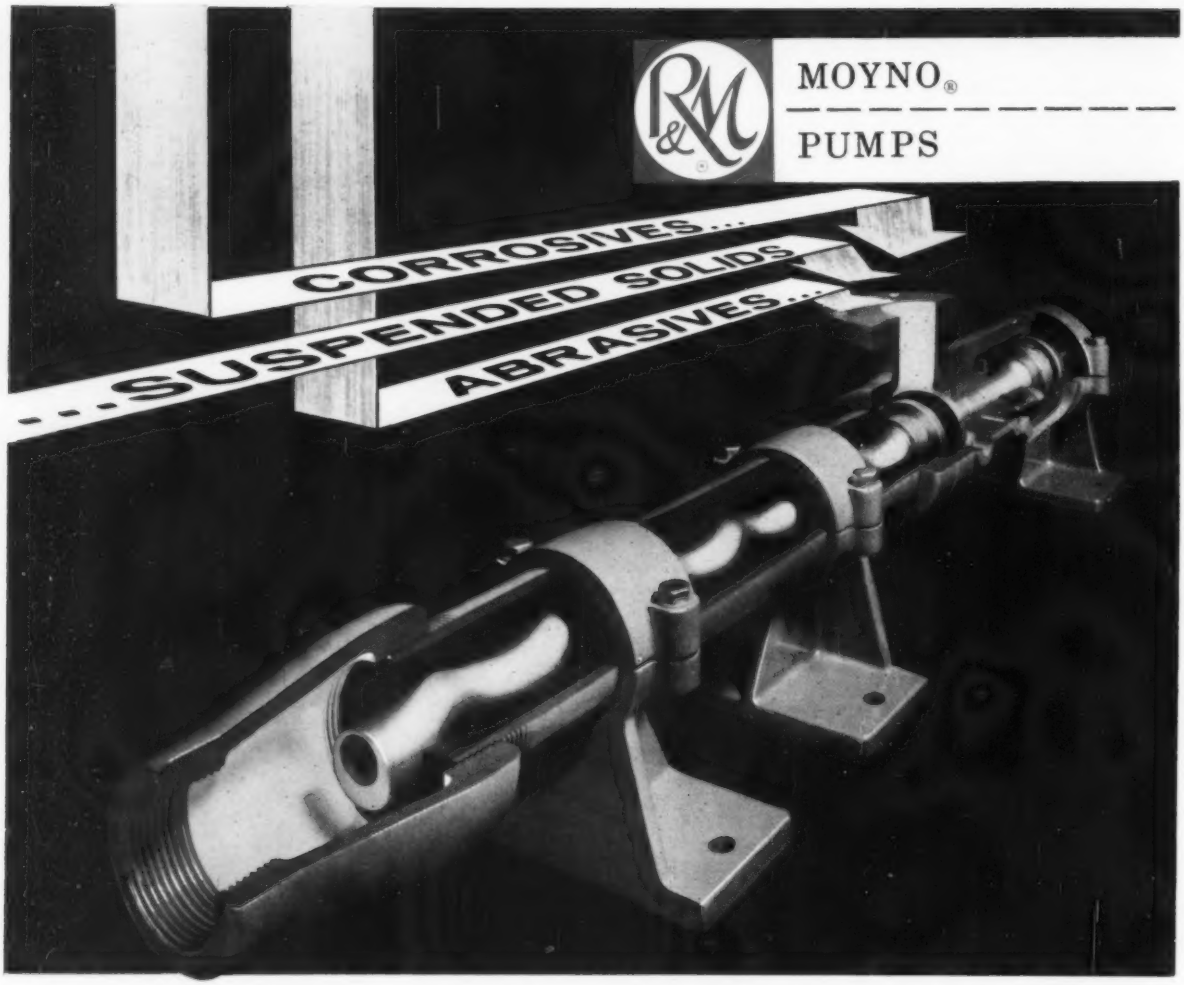
Atlas xenon-lamp-equipped Fade-Ometer.

The Allen Model "G" warper for all yarns, including paper and covered rubber.



High-speed warper makes warps of uniform density

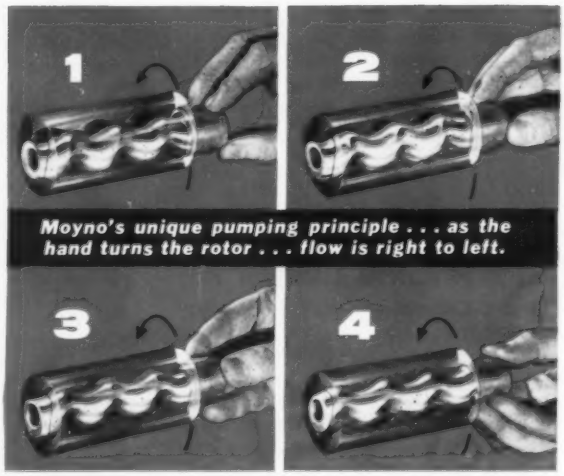
The Allen Model "G" Warper for warping of cotton, woolen and worsted, synthetic, paper, and covered rubber yarns at speeds up to 1,000 ypm features a hydraulic control system which provides uniform warp density and uniform yarn speed. To permit the operator to compensate for yarn type and environmental changes and thus obtain maximum production of high quality warps, a variable speed control is also in-



MOYNO® *solves tough pumping problems!*

Moyno's "progressing cavities" successfully handle thin watery slurries, non-pourable abrasives, gnawing corrosives or suspended solids up to 1⅛" dia.—without crushing, foaming or aerating! Material contacts only one moving part, a screw-like rotor revolving in a double-threaded stator. Where corrosives or abrasives are to be handled, rotor and stator are made of special resistant materials that minimize maintenance and prolong pump life. Many materials now pumped by Moyno were once considered "unpumpable" . . . had run up prohibitive maintenance costs on other type pumps or ruined them completely!

Moyno pumps are available in capacities to 500 gpm; pressures to 1000 psi. Learn more . . . write today for new Bulletin 100-TI!



Moyno's unique pumping principle . . . as the hand turns the rotor . . . flow is right to left.

ROBBINS & MYERS, INC., Springfield, Ohio

Fractional and Integral HP Electric Motors • Electric Hoists and Overhead Traveling Cranes • Moyno® Industrial Pumps
Propellair® Industrial Fans • R & M-Hunter Fans and Electric Heat • Trade-Wind Range Hoods and Ventilators
Subsidiary companies at: Memphis, Tenn., Pico Rivera, Cal.f., Brantford, Ontario.

For further information use Handy Return Card, Page 155

cluded. This gives fingertip control of yarn speeds which are infinitely variable over a ratio of 4 to 1.

Other features: (1) safety control rod that extends over full width of machine; (2) powerful, flat, friction-type clutch that requires little maintenance; (3) quick stopping by mechanical or hydraulic brake within the drive-pressor cylinder; (4) blower keeps lint off combs and stop motion; (5) operating controls are conveniently located on a central control panel; (6) sensitive electric stop motion; (7) positive expansion comb.

Allen Co., Inc., P. O. Box 98, Acushnet Station, New Bedford, Mass.

Do you want more data? Write supplier or use postage-free card on page 155; list C-106

Apron solves drafting problems

Increased durability and greater drafting effectiveness are advantages provided by the new Dayco X7 apron which is available in all sizes for both long and short systems.

The problem of deterioration in aprons has been met by the introduction of a new special skin-like surface on the outer surface. This maintains fingertip control for smoother, easier drafting of all types of fibers.

Dayco Textile Products Co., 401 South Carolina National Bank Building, Greenville, S. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-107

Long bottom apron changeover with deluxe features

The Whitin Long Bottom Apron Changeover (WLBA) is a composite drafting system which utilizes in effective combination three principal elements: (1) the Casablancas GX2 cradle that increases yarn strength and improves evenness; (2) the Unitrol center suspension weighting unit which applies weighting to the top rolls through the compression of accurately calibrated coil springs enclosed within the arm; and (3) a new, long bottom apron arrangement with a spring-loaded tension device that provides improved fiber control in the main drafting zone.

The system may be furnished with new antifriction - bearing - equipped roll stands of 30-, 45-, or 60-degree inclination to decrease cleaning requirements and eliminate the need for oil in the drafting zone. New compound draft gearing that permits much higher draft constants and more sturdy construction is also available. Equipped with antifriction bearings, this gearing eliminates yarn patterns which originate from worn gearing.

Whitin Machine Works, Whitinsville, Mass.

Do you want more data? Write supplier or use postage-free card on page 155; list C-108

Winds 24- to 36-lb package that won't tangle in creel

A single-spindle, drum-type winding machine for tufting and other coarse yarns produces a package with a locking wind that keeps ends from falling down and tangling during handling. Designated the Model P.U. precise winder, it builds a package up to 14" in diameter and weighing from 24 to 36 lb. Traverse speed is reduced to maintain winding precision as the circumference of the package increases and the angular velocity dwindles. Machine stops automatically when the preset package size is attained.

Leesona Corp., P. O. Box 1605, Providence 1, R. I.

Do you want more data? Write supplier or use postage-free card on page 155; list C-109

Space-saving cloth skid parts can't be lost

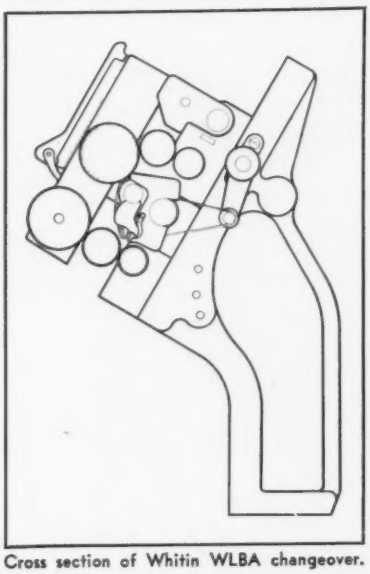
Inter- and intra-plant transportation of cloth is facilitated with a new collapsible cloth skid which is designed so that loaded skids can be stacked on top of each other and sides folded down when skids are empty. All components are fastened together to prevent their being misplaced.

J. C. Paddock Co., South Church St., Extension, Spartanburg, S. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-110

Size compounds for new preparation equipment

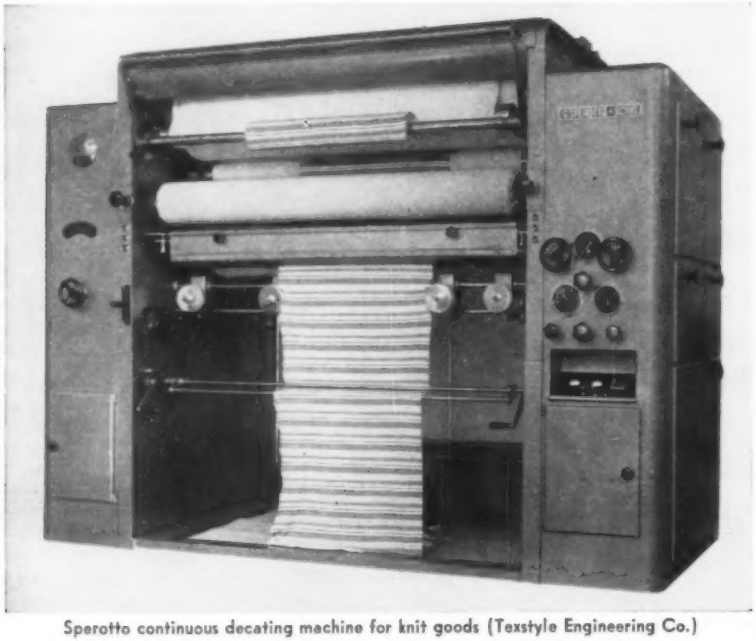
A new product for use in mills with high temperature converter systems is the Texsize 963. A soft, pudgy type of product, it can be pumped and metered into heat exchangers at any given rate. The normal use-rate is 8-10% based on the dry weight of



Cross section of Whitin WLBA changeover.

Single-spindle precise winder (Leesona).

Paddock collapsible cloth skid.



Sperotto continuous decating machine for knit goods (Texstyle Engineering Co.)

Continuous knitgoods decating machine

Completely uniform decatizing of knitted wool, cotton, and blend fabrics (tubular or open-width) is obtained with the Sperotto Model CTN/MG Continuous Decatizing Machine. The machine actually breaks down the basic structure of the yarns and then reconstitutes them so that they are set and the fabric will not curl, achieves a matte finish with good drapability, and imparts a luxurious handle to the fabric. Fineness of control makes it possible to obtain various finishes with the machine which is economical to operate as only one operative and a 20-yd mantle is required.

Texstyle Engineering Co., 87 Merrison St., Teaneck, N. J.

Do you want more data? Write supplier or use postage-free card on page 155; list C-113

starch which passes through the converter as slurry.

Texsize 960 is a water-dispersable, dry product which can be incorporated into cold starch slurries for use in conjunction with Nemo cookers and/or high temperature starch converters. It offers ease of handling, is 100 per cent active in dry form, and does not include starch and fillers.

Texize Chemicals, Inc., P. O. Box 1820, Greenville, S. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-111

Strips paper spinning tubes safely and quickly

The Timmer automatic bobbin stripping machine efficiently removes yarn of any size from paper spinning tubes—as well as from wooden, plastic, or metal yarn carriers—without damaging them. Two models of the machine are available; one operates in one direction only and the other in both directions. A skilled operator can strip 3,500 bobbins per hour on the former; 7,000 on the latter.

Stripping is accomplished by adjustable springy main strippers and finishing strippers which are covered with highly wear-resistant plastic material and simultaneously polish the shaft or barrel of the bobbin.

A special bobbin feeding device for the machine automatically dumps a box of bobbins to be stripped into the bobbin bin, saving both time and labor. A bobbin separation attachment is available for use where the carriers to be stripped are tangled by threads.

The bobbin stripping mechanism is safely enclosed and readily accessible for inspection and maintenance, being covered with a hinged hood made of cast aluminum. Maintenance cost is minimized by use of antifriction bearings at a number of points.

Holt Associates, Inc., P. O. Drawer 1319, Greensboro, N. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-112

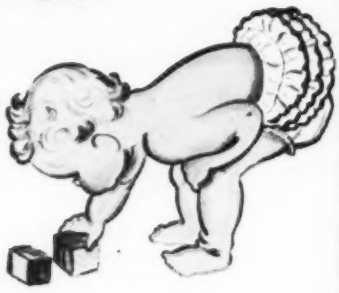
Makes nonwovens from all-short-fiber mix

Short fibers such as bleached sulphite pulp, linters, fiberized paper, metal fibers, fiberized leather, flexible plastic foam, flock, and other special materials may be used in the Model 40B Special Rando-Feeder and Rando-Webber for the continuous production of uniform specialty papers, reconstituted leather and plastics, and metallic grids for filtration and reinforcing media. Simplicity and versatility of operation, low maintenance and manpower cost, and a high rate of quality production

Curlator Corp.'s Model 40B Special Rando-Feeder and Rando-Webber.

Moropol 762

the non-soil retentive durable non-ionic resin softener



Moropol 762 increases tear strength and abrasion resistance, and adds to the crease angle in resin treated fabrics. These properties are durable for the life of the fabric.

The "hand" imparted by Moropol 762 as a resin softener is silkier than with other durable softeners, and is excellent for fabrics like women's apparel. It does not contribute to the pickup of soil and will not retain soil or dirt during laundering, as do many thermoplastic resin softeners. This feature recommends its use on white goods in preference to acrylate, silicone, and polyethylene softeners.

General Properties

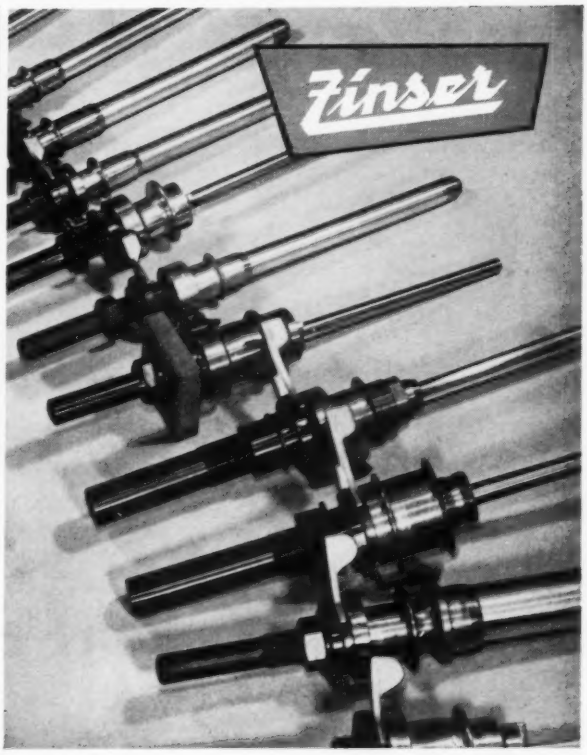
Chemical Nature:	An aqueous non-ionic dispersion of an epoxy type plasticizer.
Appearance:	Creamy white emulsion
Concentration:	40%
pH:	6.0 - 6.5
Compatability:	Compatible with water phase resin solutions as well as cationic, acid, alkaline, and metal salt additives.
Stability:	Freeze-thaw and storage stable for over 6 months.
Shipped:	In 55 gal. drum containers . . . exact net wt. 440 lbs.

Let us send you technical data on Moropol 762

MORETEX *Chemical Products,* INC.

314 W. Henry St., Spartanburg, S.C.

Established 1908 — Manufacturing Chemists



Why More And More Textile Mills Demand Zinser SKF Spindles

There are good reasons why more and more mills are using performance-proven Zinser Spindles with SKF inserts.

Because of the higher speeds and larger packages possible with Zinser Spindles, mills have increased production in many cases up to 20%. Zinser Spindles are smooth running at highest speeds, easier to maintain and simpler to lubricate.

Sized for bobbin weights from 1¾ ounces up to 12 pounds.

Whatever your spindle needs, investigate Zinser, manufacturers of filling spindles, warp spinning spindles, large paper package woolen spindles, high-speed twister and draw twister spindles . . . all with SKF inserts.

Watson & Desmond
INCORPORATED

P. O. Box 1954 • Charlotte, N. C.

The Number Is...EDison 3-6154

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EDison 3-6154

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Box 701
BRoadway 3-3012

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Richard V. McPhail
Box 1174
UNiversity 5-8631

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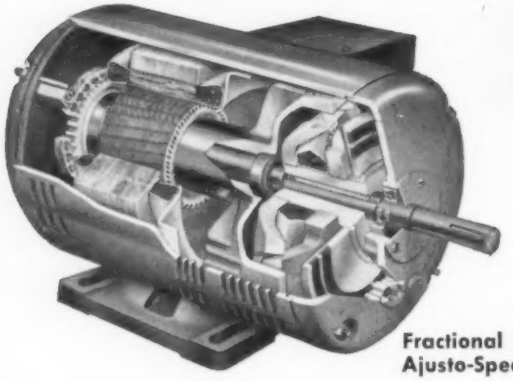
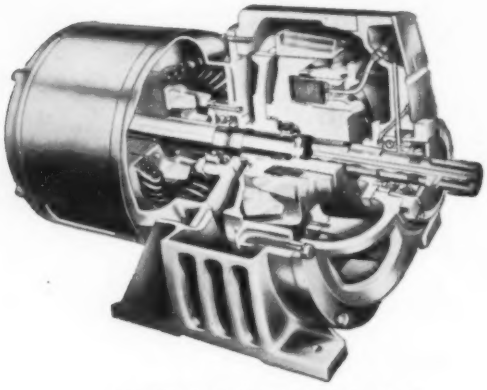
Bring Your Speed Control Problems to

EDDY-CURRENT HEADQUARTERS



Fractional HP
Ajusto-Spede Drive



Air-Cooled Ajusto-Spede Drive

EATON
DYNAMATIC

Let Our Years of Speed Control Experience Go to Work for You!

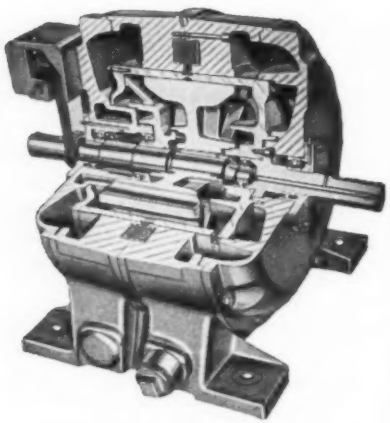
30 years ago Dynamatic pioneered the utilization of eddy-currents in industrial rotating equipment. Today, the Dynamatic Division of Eaton Manufacturing Company is the recognized leader in the development and production of eddy-current drives, couplings, brakes, and dynamometers—equipment which is solving production problems in every major industry.

In speed control applications, Eaton-Dynamatic Eddy-Current Equipment offers many exclusive advantages—stepless adjustable speeds from AC power, rapid response, wide speed range, quiet operation, low power loss, low maintenance cost, remote control, simple electronic or transistorized control.

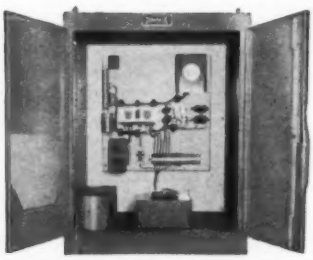
Dynamatic Eddy-Current Equipment is available in sizes from ¼ hp Ajusto-Spede Drives to heavy-duty couplings rated up to 20,000 hp—and larger.

When you have a speed control or drive problem, bring it to "Eddy-Current Headquarters"—we can provide a simple, economical solution.

Write for Illustrated Descriptive Literature



Magnapower Heavy-Duty
Liquid-Cooled Coupling



Magnetic Amplifier (Transistorized)
Control

EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
3122 FOURTEENTH AVENUE • KENOSHA, WISCONSIN

For further information use Handy Return Card, Page 155

are some of the advantages provided by the machine which lays a continuous web of uniform, predetermined thickness.

Curlator Corp., Textile Div., 501 W. Commercial St., E. Rochester, N. Y.

Do you want more data? Write supplier or use postage-free card on page 155; list C-114

High-production piqué knitter features simplicity of design

Up to 18 yd or 16.9 lb per hr of 64-in.-wide, 15-oz piqué with 34 courses to the inch can be produced from 1/32 worsted yarn on a 32-feed, 18-needles-per-in. machine developed especially for high-output knitting of quality piqué fabrics. Manufactured in fine cuts up to and including 18 needles per inch, this new 30"-diameter machine is of the stationary cylinder type with the stationary take-up placed near the floor to exert uniform tension on the fabric as each course of stitches is formed.

Dial and cylinder are designed to hold needles in their correct position so that proper mesh is maintained between dial and cylinder needles; also to prevent needles being pulled together.

Scott & Williams, Inc., Brinton Fabrics Machine Div., Laconia, N. H.

Do you want more data? Write supplier or use postage-free card on page 155; list C-115

FIBERS & YARNS

Blue-white solution-dyed acetate

Developed especially for bridal wear fabrics was "Diamond-White" Chromspun 332, a blue-white solution-dyed acetate yarn that eliminates the necessity for extra processing to obtain the shade required for lustrous satins, peaus, and taffetas. Available in 100, 150, and 300 denier sizes, the yarn also is expected to be useful on fabrics for party dresses, swimwear, blouses, lounge wear, etc.

Eastman Chemical Products, Inc., 260 Madison Ave., New York 16, N.Y.

Do you want more data? Write supplier or use postage-free card on page 155; list C-116

Fiber for use in full-fashioned sweaters

A new type of "Orlon Sayelle" bicomponent acrylic fiber for use in fine gauge, full-fashioned sweaters is available. Called "Orlon Sayelle" Type 24, it is currently being produced in three denier cut staple. Six denier staple and tow will be available soon.

Textile Fibers Dept., E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

Do you want more data? Write supplier or use postage-free card on page 155; list C-117

Whiter saran yarn

Tropic White Saran is a snow white yarn that stays whiter longer without sacrificing any of saran's other properties.

The National Plastic Products Co., Odenton, Md.

Do you want more data? Write supplier or use postage-free card on page 155; list C-118

NEW "LIGHTWEIGHT" PERALTA® MACHINE

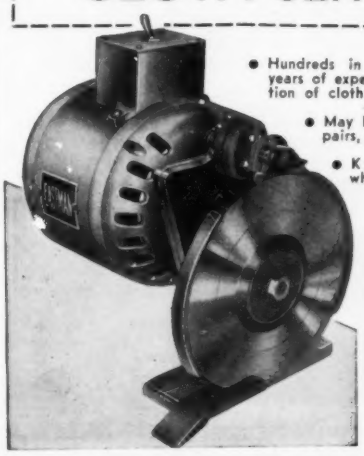
with
Off-set Roll Arrangement
Doffing Device Attachment
Hydraulic Pressure

Write for information.

Duesberg-Bosson of America, Inc.
Main Street Jefferson, Mass. P.O. Box 25

for CONTINUOUS SELVEDGE-TRIMMING, CLOTH SLITTING, or BOTH SIMULTANEOUSLY

EASTMAN model SMS
STATIONARY-MOUNTED
CLOTH SLITTER



- Hundreds in use. Backed by 58 years of experience in the production of cloth cutting machines.
- May be mounted singly, in pairs, or spaced as needed.
- Knife is sharpened while machine is in use.

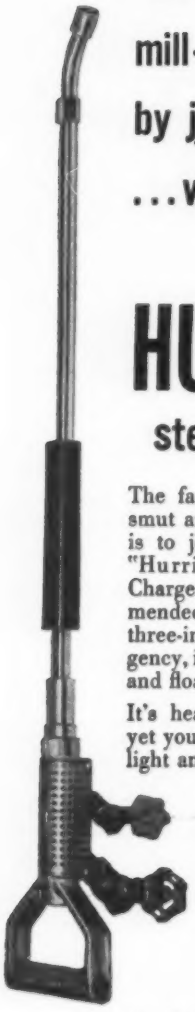
Send for Folder

DEMONSTRATION in YOUR PLANT gladly arranged. Write, wire or call.

EASTMAN MACHINE COMPANY
BUFFALO 3, N. Y.
Telephone Area Code 716 TL 6-2200

NOW...

mill-wide cleaning by jet-blast ...with the new Oakite HURRICLEAN® steam-detergent gun



The fast, new way to remove lint, oil, smut and grease from textile equipment is to jet-blast it loose with the Oakite "Hurriclean" steam-detergent gun. Charge this powerful gun with recommended Oakite detergent and you get three-in-one cleaning power: heat, detergency, impact. Then twist a valve to rinse, and float off all the loosened soil.

It's heavy-duty mechanized cleaning... yet you've never handled a unit so safe, light and easy.

SAFE Steam travels in an inner, insulated tube. Outer tube conveys the cool detergent solution. Mixing takes place at the nozzle. This keeps the gun always cool to the touch, always safe.

LIGHT Weighs a mere 6¼ lbs.

EASY A twist of the tube grip changes direction of the spray. No dragging and kinking of hose lines. Cleaning 'from under' is a cinch.

You'll find that the Oakite "Hurriclean" gun brings big savings in time and money, while doing a far better cleaning job on looms, spinning frames, tenter chains, dye kettles, slasher drums, drying cylinders and other equipment, and, of course, on floors and walls.

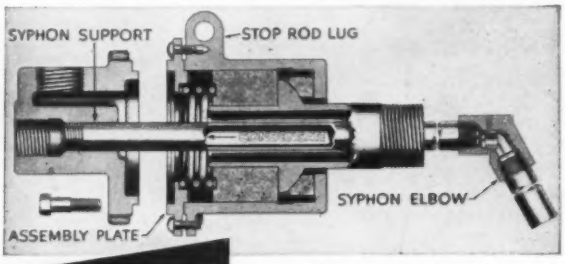
Ask your local Oakite man to let you try out the "Hurriclean" steam-detergent gun. Or write for details to Oakite Products, Inc., 42 Rector Street, New York 6, N. Y.

OAKITE

over 50 Est. 1909 SCIENCE years' leadership in industrial cleaning

TRY THIS on your Dry Cans and 30" Slasher Cylinders

We'll gladly furnish a pair of these units for 90-day obligation-free trial in your mill. The Type SB2P is self-supporting, completely packless, needs no lubrication or adjustment. The Johnson Syphon Elbow permits the use of two straight pipes instead of an unwieldy curved syphon pipe, is hinged to pass right through the joint.



Johnson ROTARY PRESSURE Joints *First in the Textile Industry*

Write for Catalog S-3002

Shows self-supporting Johnson Joints for all needs . . . on print cans, calenders, compressive shrinkage ranges, big 5' and 7' cotton slashers, dry cans, etc.

THE JOHNSON CORPORATION
815 Wood St., Three Rivers, Mich.

add MORE YEARS to your GEARS

★ Now you can have heat-treated steel gears having FOUR TIMES more life than similar gears which are untreated or poorly treated.

★ Ferguson Gear's completely scientific heat-treating installation assures uniformly hardened gears up to 17" diameter by 6" face. 100% uniformity of treatment from gear to gear as well as from tooth to tooth. Only the web and bore remain soft, insuring a minimum of distortion.

★ Get information or quotation about the Ferguson Gear process that will save you trouble, time and money. Contact your nearest Ferguson Sales Engineer, or write direct to Ferguson Gear Company, 511 Airline Avenue, Gastonia, N. C.

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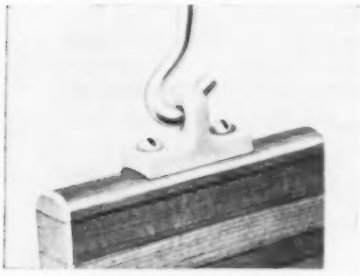
SAVANNAH, GA.	HARVEY D. BLACK	TEL. ADams 6-9479, 2010 Florida Ave.
MEDIA, TEX.	L. D. TAILEY	TEL. GY 6-3295 BOX 1169

For further information use Handy Return Card, Page 155

PRODUCT BRIEFS

Nylon harness eye

Use of the new Stehedco Nylon Harness Eye on heddle frames prevents metal-to-metal contact at that point, eliminates scoring of wood or



frame hang-up, and reduces the possibility of a frame drop. Two screws hold the eye on the stick and add considerably to pullout strength. Tests on cam looms operating at 260 ppm have shown no wear of the part after 1,600,000 picks.

Steel Heddle Mfg. Co., Box 6833, Philadelphia, Pa.

Do you want more data? Write supplier or use postage-free card on page 155; list C-119

Two cutting room aids

The Model MP Pattern Perforator is a multi-purpose machine because it saves considerable time in the making of duplicate markers by several methods. The saving is the result of two innovations: (1) a free-wheeling clutch that stops the needle and enables operator to make single punches where needed, and to move machine about without taking it off the work; (2) a solid, sharp-pointed needle, similar to steel phonograph needles, to make pin-pointed impressions when wanted. Machine is easily handled and can follow any shaped line, including small inside curves, as fast as operator can handle machine.

A new cloth drilling machine, the Eastman Model CDH "Hot Drill," is equipped with a drill-heating unit, so it is virtually two drills in one for it can be used either hot or cold. With the heating unit turned on, the drill may be used (1) with woolens,

jerseys, or other goods in which a drill hole tends to close up when cut parts are handled in stitching; (2) with plaids, tweeds, etc., in which a drill hole is easily lost to the eye; and (3) with filament nylon and other slippery fabrics, instead of cloth clamps and tacking nails or staples, to anchor a lay.

Eastman Machine Co., Buffalo 3, N. Y.

Do you want more data? Write supplier or use postage-free card on page 155; list C-120

Trouble-free roving bobbin holder

Sealed ball bearing, built-in spin resistance, permanent lubrication, and built-in screw driver are some construction features of the Winslow

SUPERIOR NORTH RESEARCH

BRINGS YOU THESE IMPROVED PRODUCTS

TRY WEAVE-WELL 740— an excellent product for use with new type starch converters—Easy to pump—Gives excellent results on the hardest weaves.

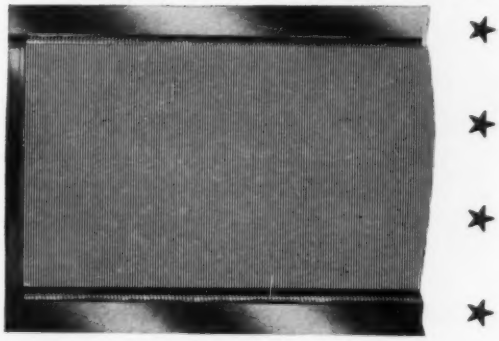
SYN-SIZE and SYN-BIND have gained rapid acceptance—Superior size for spun dacron and cotton blends.

FULL LINE OF WEAVE-WELL PRODUCTS.

FRANK G. NORTH

INCORPORATED

P.O. BOX 10573 **ATLANTA, GA.**



BRAND NEW!

PIONEER'S

DURAFLEX REEDS

FOR HIGH QUALITY CLOTH

Pioneer's new "Duraflex" construction reeds produce much better quality cloth than all metal reeds for two reasons: 1. There is no distortion in the dent wires; 2. There is no dent breakage.

Request a demonstration of this remarkable new development today!

PIONEER

HEDDLE AND REED COMPANY

P. O. BOX 10586 **ATLANTA, GA.**

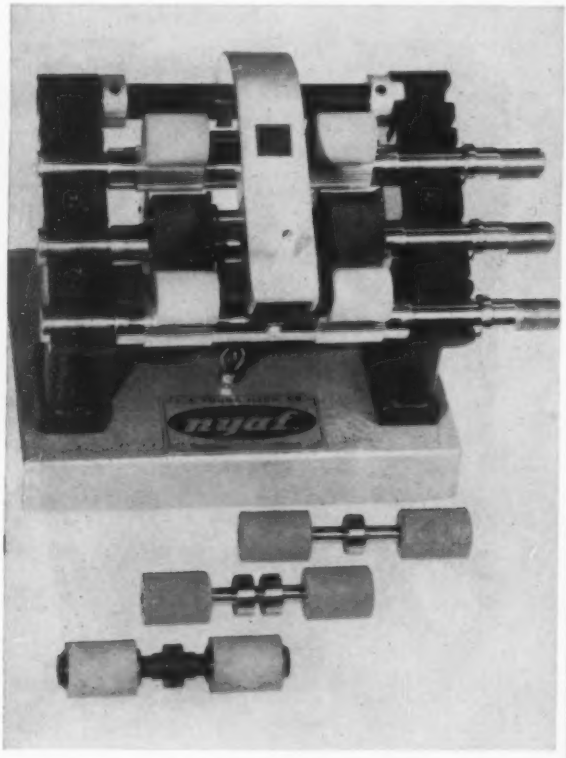
NEW! A CHOICE–

NYAF CENTER-SUSPENDED
FAFNIR BEARING ROLLS
(SINGLE OR DOUBLE)

SELF-ALIGNING
BOTTOM ROLL BEARING
—LUBRICATED FOR LIFE—

OR

NYAF CENTER-SUSPENDED
Rolls with Bearings under Cots
—Can be Lubricated—



PROVEN **NYAF** DRAFTING
SYSTEM FOR QUALITY
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F. A. YOUNG MACHINE CO.
Telephone University 3-8356 GASTONIA, NORTH CAROLINA

Put your capital to work...

FULL TIME

Your capital can produce maximum profits only if you give it the chance for maximum turnover.

You can release capital tied up in accounts receivable and accumulated seasonal inventories through FACTORING – the time-tested method of stimulating capital turnover and of controlling the vital cash flow.

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John P. MAGUIRE & COMPANY, INC.

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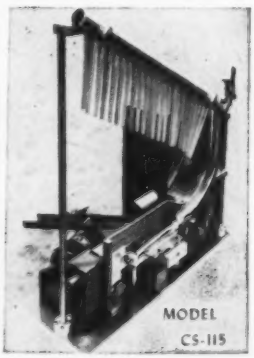
THE QUIL-CHEK

DEVELOPED BY WEST POINT MFG. CO.



FOR
Automatically
Inspecting
Quills
FOR
Run-Out

The quill serves as a basis for forming a yarn package. Any excessive unbalance due to misalignment of the hole or warping (run-out) will result in the production of inferior yarn and in ends down. Other possible effects are variations in yarn tension, smaller package and shuttle trouble. The Quil Chek automatically passes or rejects quills based on the quills runout and the setting of the unit. Range of quills handled is 7-3/8 to 10-¾ inches in length and the rate is at 3600 quills per hour.

Brochure and Price Upon Request.

CUSTOM SCIENTIFIC INSTRUMENTS, INC.

541 Devon St. Kearny, N.J.

WYman 1-6403

For further information use Handy Return Card, Page 155

Bobbin Holder. Self-aligning ball bearing permits ten degree misalignment without interfering with rotation uniformity. Wearing parts are hardened and treated to resist rust and corrosion. Lint cannot enter holder. Bobbins cannot fall.

Watson & Desmond, Inc., P. O. Box 1954, Charlotte, N. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-121

One jackstick for all treadle positions

A new sliding-cuff jackstick for all treadle positions on a loom simplifies supply ordering procedures, reduces wear from turnbuckle assembly vibration, and reduces the quan-

tity of jacksticks required for inventory. The stick is more durable since there are no notches in it. Sliding cuff is anchored firmly to the stick (there are no nails or pins). Jacksticks of different lengths use interchangeable sliding-cuff assemblies.

Louis P. Batson Co., P. O. Box 772, Greenville, S. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-122

Spray-on "antistick" coating

"Slip Coat" is a freon-tetrafluoroethylene compound that can be sprayed from the can onto most materials to provide: (1) slipperiness; (2) "abhesiveness" (antisticking condition); (3) dust, water, and oil repellency; and (4) nonoiliness. The coating thus applied has great thermal stability (melts at about 500 F), resists practically all chemicals, and is nonflammable. Textile mill applications include dry cans, slasher cylinders, hosiery forms, buckets and other containers.

Livingstone Coating Corp., P. O. Box 8282, Charlotte 8, N. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-123

Non-matting take-up roll covering

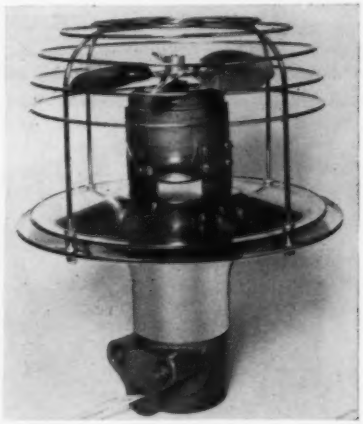
A nonwoven fabric for covering pressure rolls on looms used to weave synthetics does not mat down, always presents an even surface, and is more economical to use than conventional wool woven felt. Designated Pressure Roll Felt Type F, it is a needle felt made of synthetic fibers and a center scrim to provide longitudinal strength.

The Felters Co., 1803 Empire State Bldg., New York 1, N. Y.

Do you want more data? Write supplier or use postage-free card on page 155; list C-124

Economical steam humidifier unit

A new steam humidification unit, the Bahnson Steamette Humidifier,



features efficient design that provides simplicity and economy of installa-

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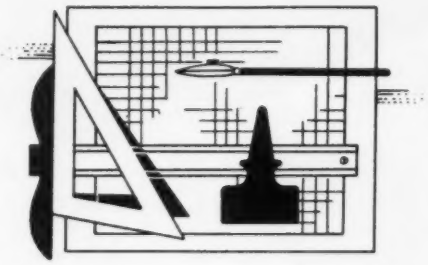
QUALITY WORKMANSHIP FOR ALL INDUSTRIES.

JENKINS Engineered Products are engineered by men who for nearly half a century have pioneered improved metal products . . . for mills and manufacturers that have moved forward with quality products and merchandise.

JENKINS covers the entire Textile Industry in the manufacture and sale of textile sheet metal parts and general sheet metal fabrication, stampings, machine work, plate and structural fabrication work. JENKINS, also, solicits inquiries from all industries requiring their services which have been greatly diversified, including Stamping and Contract Manufacturing.

For example, JENKINS Metal Shops now are sole manufacturers of a new aluminum carrying tray for hospitals that has national recognition and distribution.



JENKINS Engineers are now pioneering the "even-better" products of the future. To be sure you're getting the *newest* advantages *first*, standardize on JENKINS Engineered Products.

Your inquiries will be greatly appreciated. Estimates given on any special job. We can give you prompt service.

SINCE 1912 JENKINS METAL SHOPS INCORPORATED ENGINEERED PRODUCTS

JENKINS METAL SHOPS, Inc.

P. O. BOX 1160

GASTONIA, NORTH CAROLINA

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— UNIFEEDER —

CARD-FEED FOR WOOL CARDS, GARNETTS,
SYNTHETIC and COTTON PICKERS

An accurate automatic **stock metering unit** that will handle **any staple fiber, natural** or **synthetic.**

This precise unit is available in 48 inch, 60, 72 & 84 inch widths. Dump to dump accuracy is less than 2½% total variation. This metering accuracy indicates the degree of opening accomplished between the comb and the apron pins. Rejected production is negligible. Simplicity of design makes this system extremely economical to operate and maintain.

Using this equipment, the result is a mat of stock, **uniform in weight and density** consistently to the feed rolls.

IT IMPROVES YOUR PRODUCT . . .
FACILITATES CONSTANT QUALITY AND
COST CONTROL . . .
REDUCES WASTE .

For more complete details of this equipment call or write:

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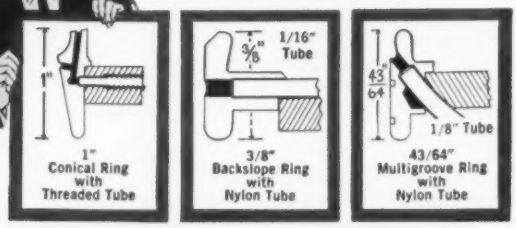

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tion and operation with high evaporative capacity. The unit discharges the steam vapor in a 360-degree radial pattern, or portions of this discharge may be blanked off as required. The corrosion-resistant construction of the unit and its compact, lightweight, unit design keep maintenance to a minimum. The automatically controlled humidifier maintains desired humidity levels with constant accuracy. Connects to existing steam supply lines (2 to 30 psig) and electrical outlets (115-volt a-c).

The Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.

Do you want more data? Write supplier or use postage-free card on page 155; list C-125

"Tangleproof" caster

A new 4" plate-type truck caster for textile mill use has extra-wide spacer washers between horn and wheel to allow lint and threads to fall freely through the horn. Also, the washers facilitate the cleaning out of any material that might collect there without removing the wheel. Thread guards have no recesses or projections. A thread baffle on each side (a step in the web of the wheel) and close fit of the thread guards practically eliminates the possibility of threads and lint binding the wheel.

Bassick Co., Bridgeport 5, Conn.

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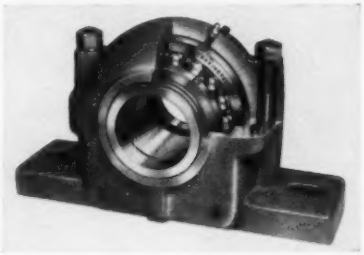
Pillow blocks for heavy duty applications

Heavy duty pillow blocks, with self-aligning spherical roller bearings in split housings, are now available in 143 sizes in two series: Series SAF (two cap bolts) and Series SDAF (four bolts). All are available for



shouldered shaft mounting or for mounting on straight commercial shafting. Housing seats are machined to bearing width plus 3/64" to permit use of pillow block as a floating or fixed unit.

The Torrington Co., Bantam Bearings Div., South Bend 21, Ind.

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Continuous mixer offers high shear action

A new Shear-Flow continuous mixer provides high shear action in continuous mix operations and is capable of mixing any liquid that can be pumped. The relatively small RL Hi-Shear mixing head is enclosed within a sealed chamber that contains an inlet for the introduction of material and an outlet for the passage of the finished mixture. Being a completely sealed unit, the mixer eliminates the possibility of air entrainment and is ideal for use on pressure systems, inversion applications, introduction of gases to liquids, and enables inflammable materials to be used with complete safety. This compact and completely self-contained unit conserves space, eliminates the need for large mixing and paddle tanks.

Gabb Special Products, Inc., Windsor Locks, Conn.

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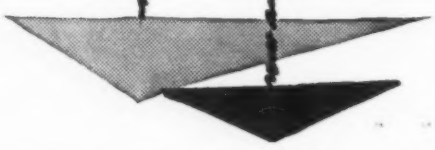

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FREE BOOKLETS

3-1 CHROMALOX HEATING CATALOG—New catalog supplement is an appendix to current industrial electric heating catalog No. 60. Edwin L. Wiegand Company, 7500 Thomas Boulevard, Pittsburgh 8, Pennsylvania.

3-2 LABORATORY PADDERS—Bulletin describes and illustrates "Minipads," a line of two and three roll laboratory padders. Birch Brothers, Inc., 32 Kent Street, Somerville 43, Massachusetts.

3-3 SKEIN DYEING—Bulletin describes how zipper tapes and other narrow fabrics may be dyed in skein form. Klauder-Weldon-Giles Machine Company, Adams Avenue & Leiper Street, Philadelphia 24, Pennsylvania.

3-4 HEAVY DUTY DETERGENT—Bulletin describes rugged detergent for heavy-duty cleaning by steam or hot tank. Oakite Products, Inc., 19 Rector Street, New York 6, New York.

3-5 F-M MOTOR SELECTION—Catalog aids in selection of suitable motors from ½ to 10,000 horsepower. Fairbanks, Morse & Company, Electrical Division, 303 North Henderson, Freeport, Illinois.

3-6 MEASUREMENT OF KNIT GOODS—Bulletin describes knit shrinkage gauge, a precision engineered laboratory instrument for measurement of both circular and warp knit goods. United States Testing Company, 1415 Park Avenue, Hoboken, New Jersey.

3-7 HIGH SPEED LOOM—Bulletin describes high speed loom with PM battery to increase efficiency on fancy fabrics. H. J. Theiler Corporation, Ashmont Avenue, Whitinsville, Massachusetts.

3-8 BEMIS BAG PRODUCTS—Booklet describes various products for packaging, including polyethylene, burlap, etc. Bemis Bros. Bag Co., 408 Pine Street, St. Louis, Missouri.

3-9 FLAT-BELT PULLEYS—Brochure describes complete line of "Sure-Grip" flat-belt pulleys from 2½ to 12 inches. T. B. Woods Sons, Chambersburg, Pennsylvania.

3-10 ILLUMINATED MAGNIFIERS—Brochure describes full line and illustrates illuminated magnifiers and microscopes. E. W. Pike & Company, 577 Pennsylvania Avenue, Elizabeth, N. J.

3-11 STAND-UP LIFT TRUCK—Complete engineering specifications and design features of gas powered stand-up, end control fork lift truck. Clark Equipment Company, Industrial Truck Division, Battle Creek, Michigan.

3-12 FIBER TRADEMARK GLOSSARY — Technical service bulletin contains generic names and definitions for manufactured fibers, both U.S. and foreign. Bulletin G-13, Product Information Div., Technical Service Department, American Viscose Corporation, Marcus Hook, Pennsylvania.

3-13 FLOOR FINISHING PRODUCTS—Revised list of laboratory tested and approved floor finishing products now available free. Maple Flooring Manufacturers Association, 35 East Wacker Drive, Chicago 1, Illinois.

3-14 MODEL H SPINNING FRAME—Brochure illustrates and describes new model H spinning frame with fifty features to fit your particular needs. Davis and Furber Machine Company, North Andover, Massachusetts.

3-15 LOUIS ALLIS MOTORS—Bulletin 2651 outlines extensive line of electric motors for a broad field of application requirements. Louis Allis Company, 427 East Stewart Street, Milwaukee 1, Wisc.

3-16 SYNTHETIC LATICES—Booklet lists the physical properties and suggested applications for more than twenty of synthetic latices. Sales Promotion Department, Naugatuck Chemical Division, United States Rubber Company, Naugatuck, Connecticut.

3-17 ROTARY JOINTS—Booklet describes rotary joints that require no lubrication and work equally well for single flow or syphon steam service. Barco Manufacturing Company, 501 Hough St., Barrington, Illinois.

3-18 DUST COLLECTION—Bulletin describes complete line of dust collecting, recovery, and classifying equipment. Buell Engineering Company, 123 William Street, New York 38, New York.

3-19 IMMUNOL SAMPLE AND BULLETIN — Free sample and textile bulletin available on Immunol, a nonflammable, nontoxic, odorless solvent. Harry Miller Corporation, Fourth and Bristol Streets, Philadelphia 40, Pennsylvania.

3-20 SLIVER HANDLING—Bulletin 502 describes how "Alley-Skat" sliver handling system speeds doffing and conveying big cans. Southern States Equipment Corporation, Hampton, Georgia.

3-21 KEEP STEAM LINES CLEAN—Information from Anderson Chemical Company describes complete service in clearing and keeping steam lines clean. Anderson Chemical Company, Box 1424, Macon, Georgia.

3-22 TOP TEXTILE APRONS—Information on complete line of top grade textile aprons for longer wear and better service. Textile Apron Company, East Point, Georgia.

3-23 RAW STOCK DYEING—Bulletin describes and illustrates raw stock dyeing machinery as part of the Morton system. Morton Machine Works, P. O. Box 947, Columbus, Georgia.

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BOOKLETS

raw stock to roving

T-101 **LUMMUS PEPPER - SHAKER OPENER.** Gives complete details and photographs. Aldrich Machine Works, P. O. Box 750, Atlanta, Ga.

T-102 **STATIC ELIMINATION.** How to eliminate static safely and inexpensively. Simco Co., 920 Walnut St., Lansdale, Pa.

T-105 **VERSA - MATIC DRAWING FRAME.** Describes drafting elements, quality of sliver, roving and yarn possible. Saco-Lowell Shops, Textile Machinery Div., Easley, S. C.

T-106 **SARGENT OPENER.** Describes opener with rotary evener and stripper. C. G. Sargent's Sons Corp., Graniteville, Mass.

T-107 **FEATHERTOUCH DRAFTING.** How to get "highest production per frame at lowest cost." Ideal Industries, Inc., Bessemer City, N. C.

T-112 **ADVANTAGES OF ALDRICH PICKERS.** Good technical text, comprehensive pictures. Aldrich Machine Works, P. O. Box 750, Atlanta, Ga.

T-113 **NEW CONDENSER TAPE.** Describes Supr-O-Tape, an impregnated fabric condenser tape. Benjamin Booth Co., Allegheny Ave. & Janney St., Philadelphia 34, Pa.

T-119 **FIBER METER.** Automatic weighing and blending assures quality, holds variation to 1%. James Hunter, Inc., P. O. Box 298, Mauldin, S. C.

T-120 **PIN DRAFTERS.** Textile job report No. 21 tells how Warner & Swasey Pin Drafters help modify jute systems for carpet yarns. Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.

T-121 **UNIVERSAL CARD COILER.** Literature describes both head and base swivel for adjustment. Includes data on 90-day free trial. McDonough Power Equipment, Inc., McDonough, Ga.

T-122 **RECONDITION OPENING & CLEANING.** Bulletin gives whys and wherefores of reconditioning your opening and cleaning lines. Special attention given to each machine with suggestions as to parts replacement. Saco-Lowell Shops, Replacement Parts Div., Box 327, Greenville, S. C.

T-123 **COILER CONVERSIONS.** Full facts on low initial cost conversion to larger coiler cans. Lists advantages, has complete description. Southern States Equipment Corp., Hampton, Ga.

T-124 **CARD DRIVE.** Bulletin 301-a describes simple, safe, efficient individual card drive. Southern States Equipment Corp., Hampton, Ga.

T-132 **PROCTOR SUPER PICKER.** Data sheet gives details of the Proctor Super Picker for use on slabs of baled cotton, or wool and synthetic blends in layers up to 12" thick. Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.

yarn and warp making

T-201 **PRODUCTS FOR SPINNING AND WEAVING.** Complete line, applications, advantages shown. Dayco Corp., Textile Div., Dayton, Ohio.

T-202 **NEW BOBBIN MANUAL.** Complete bobbin guide. Lestershire Spool Division, National Vulcanized Fibre Co., Wilmington 99, Delaware.

T-203 **SPINDLE OIL.** "Gulfspin" insures against excessive wear and eliminates spindle wobble. Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa.

T-205 **HIGH SPEED AUTOMATIC QUILLER.** Lists advantages and dimensions of "Autocopser." Terrell Machine Co., Inc., P. O. Box 928, Charlotte, N. C.

T-208 **PACKAGED SPINNER MODERNIZATION.** Details on Collecto-Vac, Open-Aire Creels, Cross-Jet Cleaner, Air Conditioning Bahnson Company, Winston-Salem, N. C.

T-209 **SECTIONAL WARPER.** Describes full width and sectional warpers for knitting, weaving. Robert Reiner, Inc., Weehawken, New Jersey.

T-210 **CONICAL RINGS AND FLYERS.** Complete details and specifications. Herr Manufacturing Co., Inc., 318 Franklin St., Buffalo 2, New York.

T-211 **PRECISE WINDING MACHINE.** For winding pineapple or straight cones and tubes of synthetics. Foster Machine Co., Westfield, Mass.

T-212 **AUTOMATIC CLEANING EQUIPMENT.** Working details and advantages of the Tri-Rail Cleaner. American MonoRail Co., 111 East 200th St., Cleveland 17, Ohio.

T-216 **SPINNING FRAME CONVERSIONS.** Big-package, new frame results at half the cost. Meadows Mfg. Co., P. O. Box 10876, Station A, Atlanta, Ga.

T-217 **COLLECTO-VAC.** New development collects line, fly and broken ends. The Bahnson Company, Winston-Salem, N. C.

T-219 **SPINNING AND TWISTER RINGS.** Complete details, pictures, price list. Whitinsville Spinning Ring Co., Whitinsville, Mass.

T-223 **FACTS ABOUT YOUR FLYERS AND SPINDLES.** Advantages of smooth flyer and spindle operation. Ideal Machine Shops, Bessemer City, N. C.

T-227 **SPINDLE OILING MACHINE.** Features and advantages noted. Wicaco Machine Corp., 4800 Stenton Ave., Wayne Junction, Philadelphia 44, Pa.

T-228 **HANDY SPINNING REFERENCE.** Shows traveler speeds, sizes of ring flanges. Saco-Lowell Shops, Parts Replacement Division, P. O. Box 327, Greenville, South Carolina.

T-229 **UNIRAIL UPTWISTER.** Higher yarn quality and better packages at faster speeds. Leesona Corp., P. O. Box 1605, Providence, R. I.

T-230 **PRECISION TEXTILE WINDING.** Tensions and density control for winding rubber cones. Kidde Textile Machinery Corp., Farrand St., Bloomfield, N. J.

T-231 **CONE WINDER.** Describes Model 102 winder, including applications. Foster Machine Co., Westfield,

T-232 **SHORT CUT TO STAPLE FIBER SPINNING.** Ten steps in operation of the Tow Stapler. Turbo Machine Co., Lansdale, Pa.

T-233 **WEAVER'S KNOTTER.** Instructions as to use, description. A B. Carter, Inc., Gastonia, N. C.

T-234 **TEXTILE ROLL COVERINGS.** Describes complete line as well as other mill supplies. Armstrong Cork Co., Industrial Div., Lancaster, Pa.

T-239 **LARGE PACKAGE TWISTER.** Information on new anti-friction Jumbo Twister which carries a 14" bobbin with a 12" build. Meadows Mfg. Co., P. O. Box 10876, Sta. A. Atlanta, Ga.

T-241 **PACEMAKER TWISTERS.** Folder gives details on high production, outlines notable features. Whitin Machine Works, Whitinsville, Mass.

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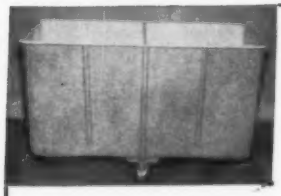

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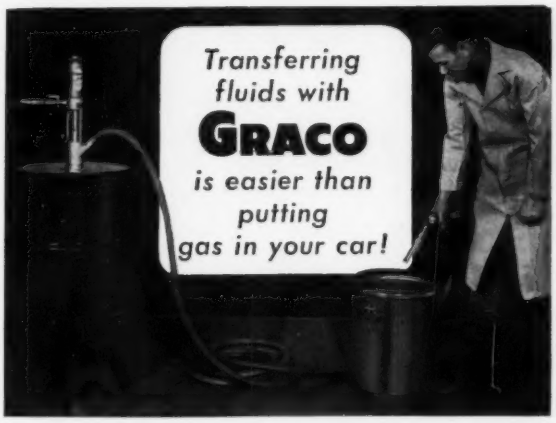

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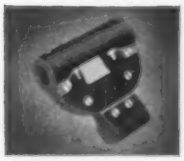

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BOOKLETS

T-242 **RING SPINNING FRAME.** Folder presents description, illustrations and specifications of up-to-date Simplex ring spinning frames. Davis & Furber Machine Co., North Andover, Mass.

T-243 **ANTI-FRICTION TWISTER BEARINGS.** Find out how bearings helped make The Meadows Twister almost friction-free. Fafnir Bearing Company, New Britian, Conn.

T-246 **BETTER BEAMS.** Information on three ways to make better beams. Kidde Textile Machinery Corp., Farrand St., Bloomfield, N. J.

T-250 **SPINNING MODERNIZATION.** Booklet shows how lower costs and improved quality are obtained by spinning modernization. Roberts Company, Sanford, N. C.

T-255 **NEW BOBBIN HOLDER.** Details on streamlined, positive latching bobbin holder. Whitehead Die Casting Co., 1140 Zonolite Rd., Atlanta, Ga.

T-256 **HUMIDIFIER PROTECTION —** Brochure tells how "Rustex" can stop rust and corrosion and prevent discolored water in your humidifying system. Odorless and completely harmless to personnel, or goods. Anderson Chemical Co., Inc., Box 1424, Macon, Georgia.

T-257 **COMETSA SPINDLES.** Bulletin gives details of high-precision, vibration free Cometsa spindles. Cometsa Spindle Co., 666 Fifth Ave., New York 21, N. Y.

slashing—weaving—tufting

T-301 **COUNTING AND MEASURING DEVICES.** Wide range of counting devices for all types of textile machinery. Veeder-Root, Inc., Hartford, Conn.

T-302 **LOOM SUPPLIES.** Describes complete line. E. H. Jacobs Mfg. Co., P. O. Box 3096, Charlotte, N. C.

T-304 **LOOM PRODUCTION CHARTS.** Celluloid card shows yards per loom per week. Ralph E. Loper Co., Greenville, S. C.

T-306 **THE STORY OF STARCHES.** History and information on manufacture and use of starches National starch & Chemical Corp., 750 Third Ave., New York 17, N. Y.

T-309 **PENFORD GUMS IN TEXTILES.** Describes their excellent properties for warp sizing spun yarns. Penick & Ford Ltd., Inc., 750 Third Ave., New York 17, New York.

T-314 **LOOM REED BOOKLET.** Describes in detail a variety of reeds. Steel Heddle Mfg. Co., 2100 West Allegheny Ave., Philadelphia 32, Pa.

T-315 **COCKER EQUIPMENT.** Information on warp sizer, beam warper, creels, tensions, back-winders, etc. Cocker Machine & Foundry Co., Gastonia, N. C.

T-318 **FORMULAS FOR SLASHING ARNEL.** Includes also information on warping, weaving and quilling. Textile Sales Dept., Celanese Corp. of America, P. O. Box 1414, Charlotte 1, N. C.

T-319 **ECLIPSE STARCHES FOR TEXTILES.** Data sheet describes use of thin-boiling starches in the textile industry, with particular emphasis on warp sizing. Physical and chemical data included. A. E. Staley Mfg. Co., Decatur, Ill.

T-321 **COCKER SLASHERS.** Complete specifications and advantages, including allied equipment. Cocker Machine & Foundry Co., Gastonia, N. C.

T-322 **MOUNTS FOR LOOMS.** Vinyl mount eliminates need for bolts or paste. Clark, Cutler, McDermott Co., 106 W. Central St., Franklin, Mass.

T-323 **UNIFIL LOOM WINDER.** Describes new concept of filling preparation which needs no quilling area. Leesona Corp., P. O. Box 1605, Providence, R. I.

T-324 **ALIGNING LAYS.** Setting instructions for step-by-step aligning. Draper Corporation, Hopedale, Mass.

T-325 **TRAVELING LOOM CLEANER.** Advantages of the new Oscillaire loom cleaner. Parks-Cramer Co., Fitchburg, Mass.

T-326 **DRAPER REPAIR PARTS CATALOG.** Contains Illustrations covering all mechanisms and construction with complete listings. Draper Corporation, Hopedale, Mass.

T-328 **TEXTILE MACHINERY PARTS CATALOG.** Describes complete line of Dayco and Thorobred textile parts. Dayco Corp., Dayton, Ohio.

T-329 **COUNTING DEVICES.** Describes complete line of counters for every application. Trumeter Company, 38 W. 32nd St., New York 1, New York.

T-331 **STATIC BARS.** Humorously illustrates how static can be overcome. The Simco Co., 920 Walnut St., Lansdale, Pa.

T-332 **CARE OF DRAPER SHUTTLES.** Describes how longer, trouble-free service may be obtained. Draper Corporation, Hopedale, Mass.

T-346 **FACTS ON NONWOVENS.** Fact file on non-wovens tells of new machinery, new methods of handling fibers, new bonding agents, etc. Curlator Corporation, Textile Division, East Rochester, N. Y.

T-347 **New DRYING SYSTEM.** Describes high capacity, custom engineered drying equipment for tufted plants. Dalton Sheet Metal Co., Inc., Dalton, Ga.

T-351 **AUTOMATIC STOP MOTION.** Complete information available on automatic stop motion for Titan warp tying-in machine. Edda International Corp., 468 Fourth Ave., New York 16, N. Y.

T-353 **BACKING FOR TUFTEDS.** How to get your tufting necessities with one telephone call. Fulton Cotton Mills, P. O. Box 1726, Atlanta 1, Ga.

T-355 **NON-WOVEN FABRICS.** Booklet gives outline of nature and history of non-woven and the manufacturing techniques of today. Booklet 56-219A. Chemical Div., Goodyear Tire & Rubber Co., Akron 16, Ohio.

T-358 **LOOM SUPPLIES.** Information on rod lubricant and applicator, sponge leather bunter, picker. Garland Mfg. Co., 54 Water St., Saco, Me.

T-362 **SIZE THAT SATISFIES.** Information on getting the correct size package for your mill. Also on Bingham line of slasher rolls. Stodghill & Co., 716 Ponce de Leon Place, Atlanta, Georgia.

T-363 **RUBBER COVERED SLASHER ROLLS.** Handy booklet tells how to get longer life and better performance from rubber covered rolls. Includes data on handling storing and grinding. Stowe-Woodward, Inc., Dept C., 181 Oak St., Newton Upper Falls 64, Mass.

T-364 **CONTINUOUS STARCH COOKER.** Booklet shows how the use of continuous cookers for starch assures accurate control, economy, low maintenance in warp sizing and finishing. Clinton Corn Processing Company, Clinton, Iowa.

For further information use Handy Return Card, Page 155

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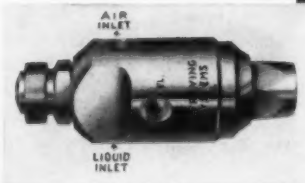

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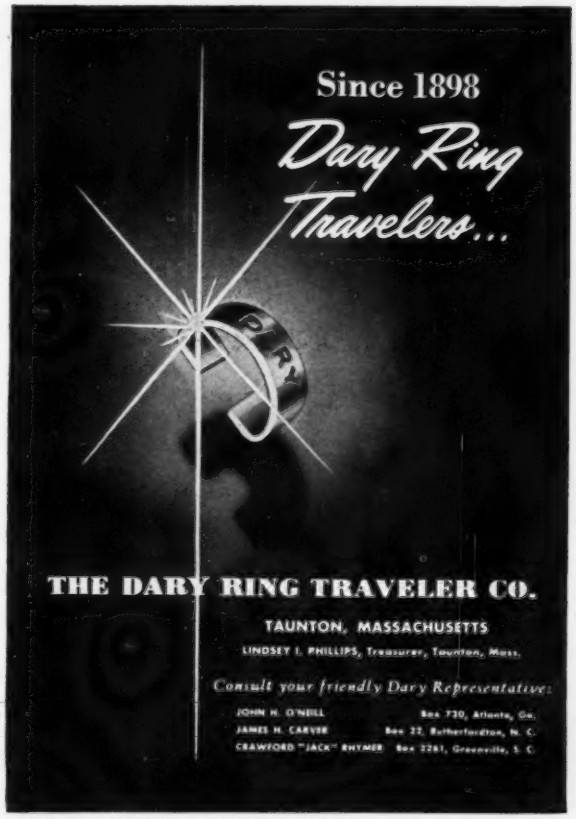

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BOOKLETS

knitting

T-401 SINGLEHEAD FULL - FASHIONED MACHINE. Literature on request from the Wildman-Jacquard Div., Draper Corp., Hopedale, Mass.

T-403 RASCHEL KNITTER. Describes new Raschel-type knitting machine. Kidde Textile Machinery Corp., Inc., Farrand St., Bloomfield, N. J.

T-406 NEEDLE OIL DOES NOT STAIN. Details on "Guiftex 39" developed for knitting mills. Gulf Oil Corp., Gross & PRR, Pittsburg 30, Pa.

T-407 KNITTING MACHINES. Information on Wildman "TFS" 30" single section F-F machines and "AL" 30" diameter 32-feed "single purpose" circular interlock machine (rib type) Wildman-Jacquard Div., Draper Corp., Hopedale, Mass.

T-410 "READING" TYPE 60 F-F KNITTING MACHINE. Information about the new "Reading" Type 60, 38-section automatic full-fashioned hosiery knitting machine. Write Textile Machine Works, Reading, Pa.

wet processing

T-500 WEBB GUIDE SYSTEMS. Folio No. EG-84 describes webb guide systems for cloth applications. G.P.E. CONTROLS, INC., 240 E. Ontario St., Chicago 11, Ill.

T-502 FINISHING MACHINERY. Text and photographs of complete line of machinery. Marshall and Williams Corp., 46 Baker St., Providenee, R. I.

T-503 WATER ANALYSIS. Includes tables, conversion factors, indicators, standard solutions. Solvay Process Div., Allied Chemical Corp., 61 Broadway, New York 6, N. Y.

T-504 UREA FORMALDEHYDE. Literature on urea formaldehyde or U.F. concentrate-85. Dept. CUFI-29-1. Nitrogen Div., Allied Chemical Corp., 40 Rector St., New York 6, New York.

T-506 CATIONIC SURFACE ACTIVE AGENT. Describes Uversoft "D." Harshaw Chemical Co., 1945 East 97th St., Cleveland 6, Ohio.

T-508 PEROXIDE BLEACHING SYSTEM. Illustrates and describes this continuous system. E. I. du Pont de Nemours & Co., Electrochemical Dept., Wilmington, Del.

T-510 TEXTILE CHEMICALS. Describes leading products for wet processors. Royce Chemical Co., Carlton Hill, N. J.

T-512 DEPUMA. Decribes odorless, viscous, non-evaporating emusion for anti-foam. Koppers Co., Inc., Chemicals & Dyestuffs Div., Porter Bldg., Pittsburgh 19, Pa.

T-513 CATALYST AC-6. Tells how curing efficiency may be stepped up as much as 25%. Monsanto Chemical Co., Plastic Division, Springfield 2, Mass.

T-514 SODA ASH BULLETIN. Contains useful data covering this subject. Solvay Sales Division Allied Chemical Corp., 40 Rector St., New York 6, New York.

T-516 ALUMINUM CHELATE PEA-1. Technical data sheet tells how aluminum Chelate PEA-1 may be used with advantage in many applications where aluminum in propiate is unsatisfactory. Harshaw Chemical Co., 1945 East 97th St., Cleveland 6, Ohio.

T-517 CHEMICAL CATALOG. Lists products with chemical composition, properties and applications. Antara Chemicals Div., General Aniline & Film Corp., 435 Hudson St., New York 14, New York.

T-519 HYDRAULIC POWER UNITS. Describes unit for operating hydraulic textile machines. B. F. Perkins & Son, Inc., Holyoke, Mass.

T-522 CUT WATER TREATMENT COSTS. Describes the control of scale, slime, algae and corrosion. Oakite Products, Inc., 126C Rector St., New York 6, New York.

T-526 PRODUCTS FOR TEXTILE IMPROVEMENT. Describes products and services designed to provide better fabrics. B. F. Goodrich Chemical Co., 3135 Euclid Ave., Cleveland 15, Ohio.

T-527 SODIUM HYDROSULFITE. Literature and test samples are available on ""T-C Hydro." Tennessee Corp., 617-629 Grant Bldg., Atlanta, Ga.

T-528 ETHANOLAMINES. Lists application, chemical and physical properties. Nitrogen Division, Allied Chemical Corp., 40 Rector St., New York 6, New York.

T-531 ROTARY DYEING MACHINE. For use in dyeing hosiery, hats, gloves, socks, etc. Turbo Machine Co., Lansdale, Pa.

T-534 DYEING AND FINISHING MACHINERY. Complete line presented in series of catalogs. Birch Brothers, Inc., 32 Kent St., Somerville 43, Mass.

T-535 DYEING, BLEACHING AND DRYING EQUIPMENT. Complete line for cotton, wool and synthetics described. Color pictures. Morton Machine Works, 1718 3rd Ave., Columbus, Ga.

T-536 NAPHTHOL RATIOS SLIDE CHART. Quickly and accurately enables operators to determine Naphthol Ratios. Alliance Color & Chemical Co., 33 Ave. P, Newark 5, New Jersey.

T-540 PENFORD FINISHING GUMS. Complete data, including physical properties. Penick & Ford Ltd., Inc., 750 Third Ave., New York 17, New York.

T-541 REGENERATION OF ZEOLITE WATER SOFTENERS. Explains advantages of Lixate Process. International Salt Co., Scranton, Pennsylvania.

T-542 DYEING SNYTHETIC FIBERS. Detailed analysis of methods and materials. General Dyestuff Co., 435 Hudson St., New York 14, New York.

T-543 INDUSTRIAL BRUSHES. Features use on shears, printing machines. M. W. Jenkins' Sons, Inc., 444 Pompton Ave., Cedar Grove, N. J.

T-544 WASTE HEAT RECOVERY. Describes system of waste heat recovery from polluted water. Ludell Mfg. Company, 5200 West State Street, Milwaukee, Wis.

T-545 WASHERS FOR SCOURING, BLEACHING, ACIDIFYING. Describes high capacity, continuous process washers. C. G. Sargent's Sons Corp., Graniteville, Mass.

T-546 NAPHTHOL FOR LIGHTFAST BROWNS. Booklet describes new, straight, non-substantive naphthol. Naphthol As-BN, for the continuous naphtholation of cotton and rayon piece goods in the dyeing of economical, fast-to-light browns. General Dyestuff Co., 435 Hudson St., New York 14, New York.

T-547 SOFTENER LUBRICANT, NAPPING AID. Technical information available on softener, lubricant and napping aid for natural and synthetic fibers, yarns and fabrics. Nopco Chemical Co., Harrison, N. J.

T-554 INSTRUMENT CATALOG. Complete information on industrial instrument accessories and supplies. Includes specifications, parts numbers and prices. Catalog 500, Foxboro Co., Foxboro, Mass.

For further information use Handy Return Card, Page 155

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BOOKLETS

T-556 HUNTER DYEING EQUIPMENT. Describes fully with diagrams Hunter Model A Dye Becks, Hunter No/Lap Reels, Model S Dye Kettles. Open Width Dye Kettles. Sample Dye Kettles. James Hunter Machine Co., North Adams, Mass.

T-557 HIGH ACTIVITY CATALYST. Technical bulletin describes new catalyst AC-6 which provides increased activity, excellent bath life, minimum odor formation, etc. Monsanto Chemical Co., Plastics Div., Springfield, Mass.

T-558 CATIONIC DYE LEVELER. Bulletin TX-34 gives new information on dye leveler for acid colors on nylon tricot and wool through use of Nopco 1425-B. Nopco Chemical Co., Textile Chemicals Div., Harrison, N. J.

T-561 PUMP POURABLE PASTES. Bulletin tells how Moyno pumps can pump any textile liquid that can be forced through a pipe, even if highly viscous or corrosive. Robbins & Myers, Inc., Springfield, Ohio.

T-563 POLYETHYLENE FINISHING AGENT. Booklet contains information needed to adopt Emulsifiable A-C polyethylene as a finishing agent to any particular process. Semet-Solvay Petrochemical Div., Allied Chemical Corp., 5th Floor T, Rector Street, New York 6, N. Y.

T-564 HYDROGEN PEROXIDE BLEACHING. Booklet discusses advantages, operating details and savings in chemical costs of Activated Hydrogen Peroxide Bleaching Process for Cotton Solvay Process Div., Allied Chemical Corp., 61 Broadway, New York 6, N. Y.

T-566 ETHYLEX GUMS. Brochure describes properties of hydroxy ethyl ether derivatives of corn starch. Applications of these noncongealing gums in warp sizing and finishing covered. A. E. Staley Mfg. Co., Box 151, Decatur, Ill.

T-572 DYEING MACHINERY FOR EVERY PURPOSE. Illustrated literature available on complete line of automatically controlled machinery. Gaston County Dyeing Machine Co., Stanley, N. C.

T-576 YARN PREPARATION. Describes products for yarn preparation, printing, finishing. Polymer Industries, Springdale, Conn.

T-577 STAINLESS DRY CANS. Information on stainless steel, 75 psi, reverse dished, head dry cans. Can be furnished Teflon-coated if desired. Sims Metal Works, West Point, Ga.

T-579 AUTOMATIC GUIDING EQUIPMENT. Catalog shows various types of automatic guiding equipment for accurate cloth guiding. Fife Mfg. Co., Inc., P. O. Box 9815, Oklahoma City, Okla.

T-580 AIR SLASHER DRYER. Shows construction and operating details. Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.

T-581 BUTT-TACKING SEWING MACHINE. Describes operation, installation of single thread butt-tacking sewing machine. The Merrow Machine Co., 28 Laurel St., Hartford, Conn.

fibers and yarns

T-601 FORTISAN-36, NEW TEXTILE FIBER. Includes charts, diagrams, text, presents technical properties. Textile Sales Dept., Celanese Corp. of America, P. O. Box 1414, Charlotte, N. C.

T-602 CAPROLAN NYLON HEAVY YARNS. Describes strength, long flex life and ready dyeability. Fiber Sales Dept., National Aniline Div., 261 Madison Ave., New York 16, N. Y.

T-604 THE CHEMSTRAND NYLON STORY. Describes the birth and growth of Chemstrand Nylon. Chemstrand Corp., 350 Fifth Ave., New York 1, N. Y.

T-605 COLOR-FAST FIBERS. Further information on "Coloray," Courtauld's solution dyed rayon staple which is a contribution to color fastness in fabrics. Courtaulds (Alabama) Inc., 600 Fifth Ave., New York 20, N. Y.

T-608 TASLAN TEXTURED YARNS. Technical information on dyeing and finishing of new fabrics made with Taslan. E. I. du Pont de Nemours & Co., Wilmington 98, Delaware.

T-609 PROCESSING NYLON STAPLE. Data sheet describes method of processing Du Pont 42 Nylon Staple in blends with cotton. Covers complete operation through sizing. Bulletin N-93. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

laboratory

T-701 TESTING INSTRUMENTS. Descriptions of 37 instruments for testing textiles. Custom Scientific Instruments, Inc., 541 Devon St., Kearny, N. J.

T-703 SHADOGRAPH WEIGHING DEVICES. Pictures and information on various types of scales. Exact Weight Scale Co., Columbus 8, Ohio.

T-705 STROBOTAC. Measures speed of rotating, reciprocating or other cyclic motions. General Radio Co., West Concord, Mass.

T-706 YARN COUNT SCALE. Data sheet tells how direct-reading instrument provides fast, accurate method of determining yarn number. Exact Weight Scale Co., Columbus 8, Ohio.

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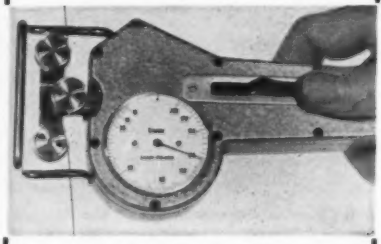

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BOOKLETS

services for management

T-801 FACTORING SERVICE. Details on advantages of factoring, including information on general banking and pension plans. Trust Company of Georgia, Atlanta, Ga.

T-805 PROFIT THROUGH FACTORING. Brochure gives facts on the use of factoring as a modern plan for developing sound business growth and added profits. Walter E. Heller & Co., Dept. TI-2, 105 W. Adams St., Chicago 99, Ill.

T-807 GROUP INSURANCE. Information on how textile group insurance can insure the happiness of your employees and make for a better running mill. Provident Life and Accident Insurance Co., Group Dept., Chattanooga, Tenn.

T-808 FACTORING. Complete details on services offered as mill factors. L. F. Dommerich, 271 Madison Ave., New York, N. Y.

T-810 THE WONALANCET WAY is the title of an editorial booklet published five times a year dealing with current cotton problems. Write Wonalancet Company, 128 Burke St., Nashua, N. H.

T-812 BEECHCRAFTS FOR 1961. Booklet available from Southern Airways Company shows how Beechcraft executive airplanes can save executives time and money. Write Southern Airways Co., P. O. Box 718, Atlanta, Ga.

T-819 ORGANIZED LUBRICATION PAYS. Planning book entitled "Management Practices that Control Costs via Organized Lubrication" shows how to effect savings in five areas of plant operation. Available from Texaco, Inc., 135 E. 42nd St., New York 17, N. Y.

plant operation

T-902 BELT LACING EQUIPMENT. Includes prices, specifications, etc. Clipper Belt Lacer Co., Grand Rapids, Michigan.

T-903 "MOTOR SELECTOR." How to select a-c motors for specific application. Bulletin B-2103. Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

T-904 GEARMOTORS, MOTORGEARS, AND FLUID DRIVES. Catalog supplies complete information on double, triple, and quadruple reduction gearmotors and motorgears. Electrofluid and fluid drives are also explained. Link-Belt Company, Dept. PR, Prudential Plaza, Chicago 1, Illinois.

T-907 WRAP UP LINT PROBLEMS. Automatic lint filter removes lint from air, winds it into disposable roll. Bulletin 234, American Air Filter Co., 275 Central Ave., Louisville 8, Ky.

T-908 TEXTILE MOTORS. Bulletin describes complete line of textile motors. Diehl Mfg. Co., Finderne Plant, Somerville, N. J.

T-909 COMPRESSORS. WB two-stage water-cooled. Space-saving units require modest foundation up to 125 psi and 1150 cfm displacement. Bulletin WB-10. Gardner-Denver Company, Quincy, Illinois.

T-910 MODERN LUBRICATION METHODS. A report to management tells how modern lubrication methods can help save thousands of dollars in three major economic areas of textile plant management. Describes twelve operating advantages of automatic lubrication systems. Lincoln Engineering Co., 4010 Goodfellow Blvd., St. Louis 20, Mo.

T-912 STORY OF NYLON BRISTLE. Tells of discovery and production, with special attention to "Tynex," a form of nylon ideal for use in brushes. M. W. Jenkins' Sons, Inc., 444 Pompton Ave., Cedar Grove, N. J.

T-913 "ONE-SHOT" LUBRICATORS. Bulletin describes wide field of application for one-shot lubricators on machines requiring closely controlled but infrequent oil feed. Bijur Lubricating Corporation, Rochelle Park, N. J.

T-914 INDUSTRIAL GREASES. Describes multi-purpose lithium soap industrial greases. Sinclair Refining Co., 600 Fifth Ave., New York, New York.

T-917 BLOWERS AND EXHAUSTERS. Full description, including detailed drawings. Buffalo Forge Co., 490 Broadway, Buffalo 5, N. Y.

T-918 PAINT STRIPPING BOOKLET. Explains simplified method of stripping paint. Oakite Products, Inc., 22 Thames St., New York 6, New York.

T-921 CATALOG OF NEEDLE BEARINGS. Design, application for five types of needle bearings. The Torrington Co., Torrington, Conn.

T-924 BALL BEARINGS FOR TEXTILE MACHINERY. Bearings for all phases of textile processing. The Fafnir Bearing Co., New Britain, Conn.

T-925 LUBRICATION OF BEARINGS. Helpful list of do's and don't to prolong bearing life. New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, New York.

T-931 NEW V-BELT DRIVES. Bulletin contains information on selection and operation of V-belt drives. Covers all types of V-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.

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PERSONAL NOTES

(from page 49)

Arthur B. Edge, III, formerly superintendent of the Hillside plant of Callaway Mills Co., has been named administrative assistant to the plant manager. **Handley H. Lewis** has accepted the position of superintendent, succeeding Mr. Edge. * * * At the Calumet plant, **Herbert H. Jones** has been promoted to plant engineer.

At the Cliffside (N. C.) plant of Cone Mills Corp., **H. Paul Bridges** has been named general manager. **Gordon D. Williams** has been promoted to assistant general manager and **Frank B. Whitaker** has been appointed superintendent. **James L. Padgett** has been named manager of designing, production, planning and testing; and **Joe L. Swing** has become assistant superintendent.

Dr. A. T. Clifford has been appointed associate director of chemical research for Riegel Textile Corp. Dr. Clifford will be headquartered at Ware Shoals, S. C. * * * **William F. Robertson,** vice-president of production, has been elevated to president of the South Carolina Textile Manufacturers Association.

Walter H. Hindle, president of Walter H. Hindle, Inc., New York City, has been elected a fellow of The Society of Dyers and Colorists of England.

Clarence A. Seibert, Scholler Bros., Inc., has been elected chairman of the Delaware Valley section of the American Association of Textile Chemists and Colorists. Other officers elected were: vice-chairman—**Edward G. Haack,** General Dyestuff Corp.; treasurer—**Charles N. Kuzma, Jr.,** Amalgamated Chemical Corp.; secretary—**Ernest W. Empting,** Verona Dyestuff.

L. Dudley Walker, formerly vice-president, has been elected president and treasurer of Walker Knitting Co. and Bassett-Walker Knitting Co., succeeding the late Sam S. Walker. Other officers elected were: vice-presidents—**George H. Box, Jr.,** and **James B. Montgomery;** secretary—**W. Elmo Haynes.**

B. Paul Lynam, formerly director of quality control at Burlington Greige Sales Co., has accepted a like position with Malden Mills, Inc.

Mr. Martin

Mr. Ellenburg

Commander Mills

Stanley Martin has assumed duties as vice-president and general manager of Commander Mills, Inc., Sand Springs, Okla. **Walter E. Ellenburg,** formerly associated with Reeves Bros., Inc., Spartanburg, S. C., has been named superintendent.

OBITUARIES

Craig Groves, 66, former chairman of the board of Groves Thread Co., Gastonia, N. C.

Robert Glenn Hafer, 53, owner of Hafer Hosiery Mills, Hickory, N. C.

Ray Augustus Holshouser, 61, retired superintendent of Cannon Mills Co., Kannapolis, N. C.

John Marshall Hood, 68, senior chemist of the research and development laboratory, Cooleemee (N. C.) division of Erwin Mills, Inc.

Abraham I. Jacoby, 61, president of Waco Sportswear, Inc., and Berjac Sportswear, Inc., Kings Mountain, N. C.

Harry Benson Kilgore, retired manager of the Woodruff plant, Brandon Mills, now Abney Mills, Woodruff, S. C.

Alfred de Liagre, Sr., 87, formerly vice-president of Botany Worsted Mills, Passaic, N. J.

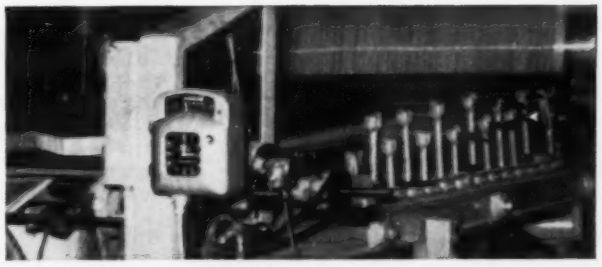
Charles R. McLean, 77, manager and treasurer of the American Mill, formerly the McLean Mill, Rockville, Conn.

Harry Myer, 67, president and founder of M&M Knitting Mills, Inc., Philadelphia, Pa.

William Stieler, 85, president of Detroit (Mich.) Knitting Mills.

Jesse Broadus Williams, 64, retired superintendent of the old Aponaug Manufacturing Co., Kosciusko, Miss.

Bernard Woodley, 68, sales and service engineer in the Far East for Rodney Hunt Machine Co.



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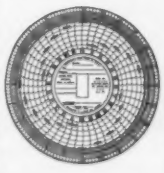

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WI61-1

MILL NOTES

Hightstown (N. J.) Rug Co. has announced plans to add a tufting unit to supplement its velvet and knitting operations. The new unit will be housed in the East Windsor Township plant with production scheduled to begin in May. Plans provide for the installation of the most up-to-date equipment for manufacturing pattern and textured carpets. New finishing equipment will utilize the latest methods of scrimming, foaming, and application of a dual back.

The Kendall Co. has announced that 100 new 50-inch looms and two high speed slashers have been installed at the Upper plant, Pelzer, S. C. * * * Leon D. Pryor is in charge of the new testing laboratory which has been installed adjacent to the buying office at the Oakland Mill, Newberry, S. C. The functions include a fiber testing service for cotton buyers, year-round testing of fibers for the mills, and also work on research projects.

A 6,000 sq ft addition to the existing plant has been announced by **Whitmire (S. C.) Knitting Mills.** The expansion program will provide jobs for 30 to 50 additional persons.

The new building of **Brady Manufacturing Co.,** located in Ramseur, N. C., has been completed. The original plant was destroyed by fire three years ago and since that time the firm has been located in Coleridge, N. C. A new cotton yarn mill organized by **Dr. Henry Jordan** and **Sam Rankin,** will occupy the Coleridge facility being vacated by Brady. Plans call for repainting, and the two separate buildings will be joined together with a two-story, 12,000 sq ft addition.

The **Charm Tread Mills,** Monticello, Ark., has announced plans for a 40,000 sq ft expansion, at an estimated cost of $300 thousand.

An expansion program at the **Clover (S. C.) Finishing Co.** is expected to provide 100 new jobs within the next six months.

A new firm, **Aladdin Knit Mills, Inc.,** has been formed for the manufacture of worsted and mercerized cotton double knits, as well as cotton and synthetic fabrics. Alan Goldberg is president, and Nat Gropper is vice-president.

The plant of **Excel Hosiery Mill,** Union, S. C., has been destroyed by fire. The finishing plant was not damaged and plans have been announced to restore the mill to operation.

Carthage Knitwear Corp. has completed the transfer of the Philadelphia operations to Norristown, Pa. The firm has consolidated its operations in a two-story, 40,000 sq ft plant located at Main and Chain Streets.

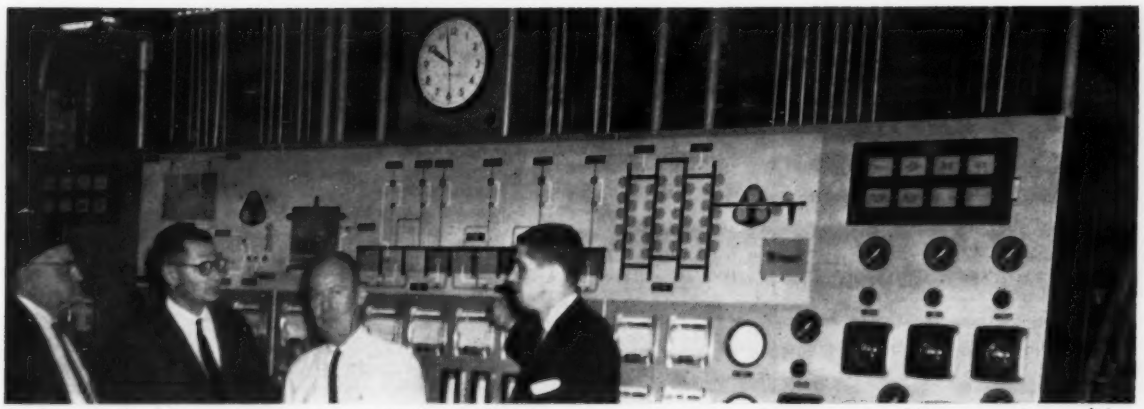
The Birmingham Engineering Education Program was recently presented a gift of $10,000 by **Avondale Mills'** Educational and Charitable Foundation. The gift will be applied to the fund to expand engineering education at the University of Alabama Center in Birmingham to provide a four-year, degree granting course.

The **Orr Felt & Blanket Co.** has discontinued the manufacture of blankets and cloth for outerwear. Approximately $500,000 will be spent for additional machinery for the manufacture of woolen and synthetic belts used on paper machines.

The **Delta Thread Co.,** Nashville, Tenn., has announced plans for an expansion program which will increase the size of the plant approximately 50 per cent at a cost of about $200 thousand.

James W. Tingley, Jr., president of **Dodgeville Finishing Co.,** Blacksburg, S. C., needed a textile chemistry student to work in the plant during the summer. Professor Joseph Lindsay, head of the Clemson College textile chemistry and dyeing department was asked to recommend one. His choice was Terry A. Hunt, whose selection turned out to be a fortunate one for both student and company. Mr. Hunt's work was so acceptable that the compony's board of directors voted a substantial scholarship to help pay the cost of his senior year expenses. The student also accepted Mr. Tingley's offer of a job this June to work in staff capacity and receive additional training after graduation.

Terry A. Hunt, Clemson College senior majoring in textile chemistry, accepts a scholarship grant from James W. Tingley, Jr., president of **Dodgeville Finishing Co.,** Blacksburg, S. C. Looking on at left is Dean Gaston Gage of the Clemson College School of Textiles. Professor Joseph Lindsay, head of the textile chemistry and dyeing department, is at right.



Another example of the trend to automation in textile manufacturing is this big instrument panel which controls the operation of a new dyeing range that was recently installed in the dyeing and finishing plant of the Trion, Ga., division of **Riegel Textile Corp.** Approximately 15 feet long and 8 feet high, the panel controls practically all of the variables in connection with the operation of the range, including temperatures and flow rates of solutions, drying temperatures, and squeeze roll pressures. In addition, operating conditions in each unit of the range are either indicated or recorded as required. This range is believed to be the only one of its type under completely automatic control. In the foreground at the left are (l to r): E. L. Gray, master mechanic; T. J. Meyer, chief engineer; Jack Welborn, assistant general superintendent; and W. W. Stover, engineer of Riegel's southern executive offices.

Troy Mills, Inc., is the new name of the former Troy Blanket Mills. Originally, the firm produced blankets exclusively; however, in recent years other products have been added.

Allstate Hosiery Mills has completed expansion plans at the seamless mill in Concord, N. C., with the addition of more 400-needle equipment. Seamless production in all styles is in excess of 10,000 dozen pairs per week.

A two-year program of plant expansion has been completed by **Synthetics Finishing Corp.,** Philadelphia, Pa. The half million dollar program has provided 45,000 additional sq ft of processing space, now fully equipped with new machinery. Recently the firm announced the establishment of a New York City depot to provide 48-hour service for the Metropolitan area.

Special awards were recently presented to the Victor plant of **J. P. Stevens & Co., Inc.,** located in Greer, S. C., for having amassed six million man-hours without a lost time accident.

A three-story building will be constructed at the Lockhart, S. C., plant of **Monarch Mills** to house air-conditioning equipment.

Windsor Knitting Mills, Inc., recently celebrated its 50th anniversary by acquiring adjacent property, on which the firm plans to expand. Detailed plans have not been announced.

North Carolina Finishing Co., Salisbury, N. C., has announced the addition of six dyeing jigs in the dye department of the man-made fiber fabric division. The new installation has increased the jig production fifty per cent.

Joanna (S. C.) Cotton Mills Co. has completed the installation of fifteen new drawing frames, some of which are the four-delivery type operating at 450 fpm and others, the two-delivery type operating at 750 fpm.

Construction of a split-level addition at **Jantzen Southern's** Seneca, S. C., plant is reported to have been completed.

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SUPPLIER NOTES

W. J. Ratcliffe has been named sales manager for the New England territory for **Putnam Chemical Corp.**, with headquarters in Beacon, N. Y. Richard Kopp has been appointed technical sales representative concentrating particularly in the field of package dyeing.

In a move to provide improved services to customers in New York State and northern New Jersey, the dyes and chemicals division of **E. I. du Pont de Nemours & Co., Inc.**, has transferred its New York district sales office, laboratory, and warehouse to 50 Page Road in Brighton Road Industrial Park, Clifton, N. J.

Norman A. Cocke, Jr., has been named manager of sales service of the fibers division of **American Viscose Corp.** In the newly created assignment, Mr. Cocke will be located in Philadelphia and will be responsible for fiber sales programming, including the coordination between sales and production, the development of marketing plans, and the supervision of technical services for customers.

Gail B. Hamilton, Jr., has been appointed manager of a new process automations sales operation in the industry control department of **General Electric Co.** In his new position, Mr. Hamilton will be responsible for the application and marketing of electrical and electronic controls used in automation of industrial process lines.

C. R. Lee has been named to head the Buffalo sales office of the chemicals division of **Eastman Chemical Products, Inc.**, subsidiary of Eastman Kodak Co. * * * Ted K. Bailey has been named a sales representative in the Chicago area.

Roberts Company has announced receipt of two contracts from Jonathan Logan, Inc., for machinery, equipment, and supplies for a complete yarn producing plant built as an addition to Logan's Butte Knitting Mills in Spartanburg, S. C.

Richard W. St. Onge has been appointed technical sales and service representative for **Scott Testers, Inc.**, in the New Jersey, Delaware, Maryland, and eastern Pennsylvania area.

Seven marketing areas, sales offices in these areas, and their managers, have been announced by **I-T-E Circuit Breaker Co.** as follows: North-Atlantic—Boston, Mass., Harry G. Johnson; Mid-Atlantic—New York City, Louis H. Hopper; Southern—Atlanta, Ga., George R. Hoffman; Mid-West—Chicago, Ill., Robert C. Engemoen; Pacific—San Francisco, Calif., Robert G. Petersen. John

New home of **Electro-Mechanical Engineering Co.**, Charlotte, N. C. Standing on steps at right is J. G. Swinney, president of the firm.

Donald Akers and Paul E. Morgan have been named managers of the Central and Southwest areas respectively, with office locations to be announced later.

W. A. Newell, director of textile research in the School of Textiles at North Carolina State College, has resigned his position to become manager of product planning at **Whitin Machine Works,** Whitinsville, Mass. Mr. Newell will be responsible for product evaluation, product line management and development, liaison with research and engineering, price-cost relationships, and mill surveys. Ferdinand M. Johnson has rejoined the Whitin organization as product manager for woolen and worsted machinery. John H. Osgood has been appointed to the newly created position of director of development. Mr. Osgood will be responsible for taking new machinery prototypes approved by the research department and finalizing their design and construction ready for full scale production.

Herbert C. Olsen has been appointed manager of textile service and development for **National Starch and Chemical Corp.**

Commemorating its 50th anniversary this month, **The Fafnir Bearing Co.** has announced plans for a Golden Anniversary program which will be highlighted by an open house at the expanded Newington plant in the spring.

John P. Bainbridge, Jr., formerly assistant service manager at Cedar Rapids, Iowa, has been promoted to New England district sales manager for **Penick & Ford, Ltd., Inc.**

William H. Jones has been appointed assistant southern manager

Mr. Newell
Whitin

Mr. Olsen
National Starch

Mr. Bainbridge
Penick & Ford

Mr. Jones
Carbic-Hoechst

of the **Carbic-Hoechst Corp.** southern district office with offices in Charlotte, N. C. Mr. Jones will continue to call on textile finishing plants in North and South Carolina.

Demonstrations of the new Cross Shearer for the carpet industry are now being scheduled by **Turbo Machine Co.** The machine shears across the carpet width instead of lengthwise, and will handle any width up to 16 ft. 6 in.

Samuel K. George has been appointed sales manager for knitting yarns in the textile division of **United States Rubber Co.**

A production process for separating pure amylose from ordinary dent corn has been announced by **A. E. Staley Manufacturing Co.** Among such possibilities for exploring and developing uses for amylose are transparent films, plastics, coating applications of all sorts, fibers and filaments.

Industrial Equipment Co. has been appointed southern sales representative for **Venango Engineering Co.**

Abington Textile Machinery Works has announced the acquisition of **Expandex Corp.** The new corporation will be active in the field of expandable polystyrene, offering custom molding, product design services, standard equipment for molding, as well as completely engineered systems.

M. A. Lynch, Jr., formerly textile products manager, has been appointed assistant to the manager of product marketing for the Silicones division of **Union Carbide Chemicals Co.**

Monsanto Chemical Co. has announced the acquisition of the interest of American Viscose Corp. in **The Chemstrand Corp.** Chemstrand will be operated as a wholly owned subsidiary of Monsanto.

Cotton-McCauley & Co. has been appointed southern distributor for **Bijur Lubricating Corp.**

Sonoco Products Co. has announced the opening of a branch plant and sales office in Ravenna, Ohio. The plant will service Ohio, western Pennsylvania, western New York, and West Virginia.

Batson Manufacturing Co. has announced plans to increase production capacity by 25 per cent during 1961. The expansion program plans new manufacturing and finishing machinery.

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